

National Park Service
U.S. Department of the Interior

Joshua Tree National Park
California



INDIAN COVE BORROW PIT RESTORATION

Environmental Assessment
May 2005



Environmental Assessment

INDIAN COVE BORROW PIT RESTORATION JOSHUA TREE NATIONAL PARK • CALIFORNIA

The Indian Cove borrow pit is a two- acre site that includes the extraction pit, an asphalt- mixing table and a service road to the site. Approximately 7200 cubic yards of material were excavated from the pit area when the borrow pit was in use. The National Park Service is considering restoration of the Indian Cove borrow pit area to the pre- existing natural topography and vegetation condition.

In the mid- 1900s, it had been National Park Service policy to create borrow pits within the monument where it was economically feasible. When Joshua Tree National Monument was in the process of establishing roads and campgrounds the Indian Cove borrow pit was located in an isolated and sparsely populated area. Better access to building materials and increasing visitor use makes it no longer practical to use Indian Cove borrow pit. Prior use of the Indian Cove borrow pit has left the site denuded of vegetation and has excluded the wildlife habitat that once existed over the two- acre site.

Indian Cove has gained the attention of rock climbers, hikers, geologists, wildlife enthusiasts and equestrian groups due to the varied resources and accessibility to the area. The Indian Cove area is a popular campground, picnic area and is also used as a staging area for hikers entering the Wonderland of Rocks from the west.

This environmental assessment and assessment of effects examines four alternatives: 1) No Action; 2) Site Enhancement through Re- contouring; 3) Site Restoration Using Imported Material; and, 4) Site Restoration Using Locally Derived Material. The fourth alternative is the preferred alternative and includes filling the borrow pit void with the same kind of material (i.e. rock derived from the parent material). The preferred alternative also includes re- grading the site to the pre- existing natural topography and replanting native vegetation grown in the park nursery.

If you wish to comment on the environmental assessment, you may mail comments to the name and address below. This environmental assessment will be on public review for 30 days. Please note that names and addresses of people who comment become part of the public record. If you wish us to withhold your name and/or address, you must state this prominently at the beginning of your comment. We will make all submissions from organizations, businesses, and from individuals identifying themselves as representatives or officials of organizations or businesses available for public inspection in their entirety.

Please address comments to: Superintendent
Joshua Tree National Park
Attn: Indian Cove Borrow Pit
74485 National Park Drive
Twentynine Palms, CA 92277

You may also e- mail your comments to: JOTR_publiccomments@nps.gov. Please reference “Indian Cove Borrow Pit” in the subject line.

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PURPOSE AND NEED

PURPOSE

Joshua Tree National Park occupies 794,000 acres of the Mojave and Colorado Deserts of Southern California, approximately 140 miles east of Los Angeles (National Park Service 1996). The park lies along the east- west transverse ranges of the Little San Bernardino Mountains. The southerly boundary of Joshua Tree National Park follows the base of these mountains along the northern perimeter of the Coachella Valley; the Morongo Basin defines the northerly boundary of the park. The majority of the park is within Riverside County, with only a small portion including Indian Cove within San Bernardino County. The park is accessible from the south by Interstate 10 and from the west and north via State Route 62.

Indian Cove is an area of the park located between the north and west entrances, with no access to the interior of the park. Indian Cove covers an area of slightly more than five square miles with facilities that include 101 family campsites, 134 group campsites and a .06- mile nature trail.

The National Park Service is considering restoration of Indian Cove borrow pit. The purpose of this project is to restore a borrow pit located approximately 1 mile east of Indian Cove Campground at an elevation of 3030 feet. The extraction area is a 0.7- acre, semi- enclosed pit that is currently used for storage of old outhouses, picnic tables and other remnant maintenance debris. The site is accessed via a ½- mile long by 10' wide bladed dirt road that has locked gate to prevent vehicle access by the general public.

Currently, the Indian Cove borrow pit encompasses two acres of denuded vegetation and excluded wildlife. This is the result an extreme compacted condition of the soil within the pit area; outside the pit area the asphalt- mixing table is impenetrable. The lack of vegetation provides no cover for wildlife and excludes tortoise habitat within the pit and through out the asphalt- mixing table. In addition to the exclusion of vegetation and wildlife, other adverse impacts resulting from the borrow pit include slope failures, unintended sediment deposition and natural drainage alteration. The extraction pit, asphalt- mixing table and associated service road have diverted the natural sheetflow over the two-acre site and have created a new drainage that is downcutting.

The main goal of the proposed project is to restore the Indian Cove Borrow pit with the minimum adverse impacts afforded by any other option.

The objectives of the restoration project are:

- Reclaim, rehabilitate or completely restore the degraded borrow pit area. At a minimum, this action must establish a geologically and hydrologically stable landscape and control of human disturbances that are causing resource degradation.
- Restore native vegetation to this area and control any exotic/invasive species of vegetation.
- Restoration of native vegetation to provide natural wildlife habitat that pre- existed prior to extraction activities.
- Provide support (watering) to native vegetation until native species have been established.

Borrow pit restoration activities follow the Resource Management Plan (1999), General Management Plan, and National Park Service Management Policies under Soil Resource Management section

4.8.2.4. (2001). However it should be noted that the General Management Plan identified that the “...borrow material would be obtained from sources outside of the park in accordance with National Park Service Management Policies.” This verbiage is somewhat contradictory with the current National Park Service Management Policies (2001) which states “...Materials from borrow pits, quarries and other clay, stone, gravel or sand sources on National Park Service land, including submerged lands, will be extracted and used only:

- By the National Park Service or its agents or contractors
- For in- park administrative uses
- After compliance with NEPA
- After compliance with other applicable federal, state and local requirements.
- Parks should use existing pits, quarries, or sources, or create new pits only after the development of a park- wide borrow- pit management policy in effect, the Resource Management Plan, the General Management and the Gravel Pit Inventory and Restoration Recommendation constitute three overlapping park- wide borrow pit management plans.

NEED

The primary need of the project is to restore the natural topography, soil, wildlife habitat and vegetation that pre- existed the development of the borrow pit. The restoration of borrow pits in the park are supported by the Resource Management Plan [section: Rehabilitate Borrow Pits] (1993), the General Management Plan “...these areas would be rehabilitated except for the possible use of two borrow pits” (1995) and National Park Service Management Policies (2001) and Strategic Plan, 2005 through 2008.

This restoration project is needed to solve anthropogenic induced problems relating to: geologic processes, vegetation, wildlife issues and is mandated by National Park Service policy. The proposed project is needed to:

Solve the problems of past and continuing disturbance relating to erosion of this site’s topography, changes in surface hydrology function, sedimentation in areas of unintended deposition, soils degradation, and loss of vegetation. As outlined in the National Park Service Management Policies (2001) Section 4.8.1 Protection of Geologic Resources which include geologic features and geologic processes, The National Park Service will “...maintain and restore the integrity of existing geologic resources ...such processes include, but are not limited to exfoliation, erosion and sedimentation.”

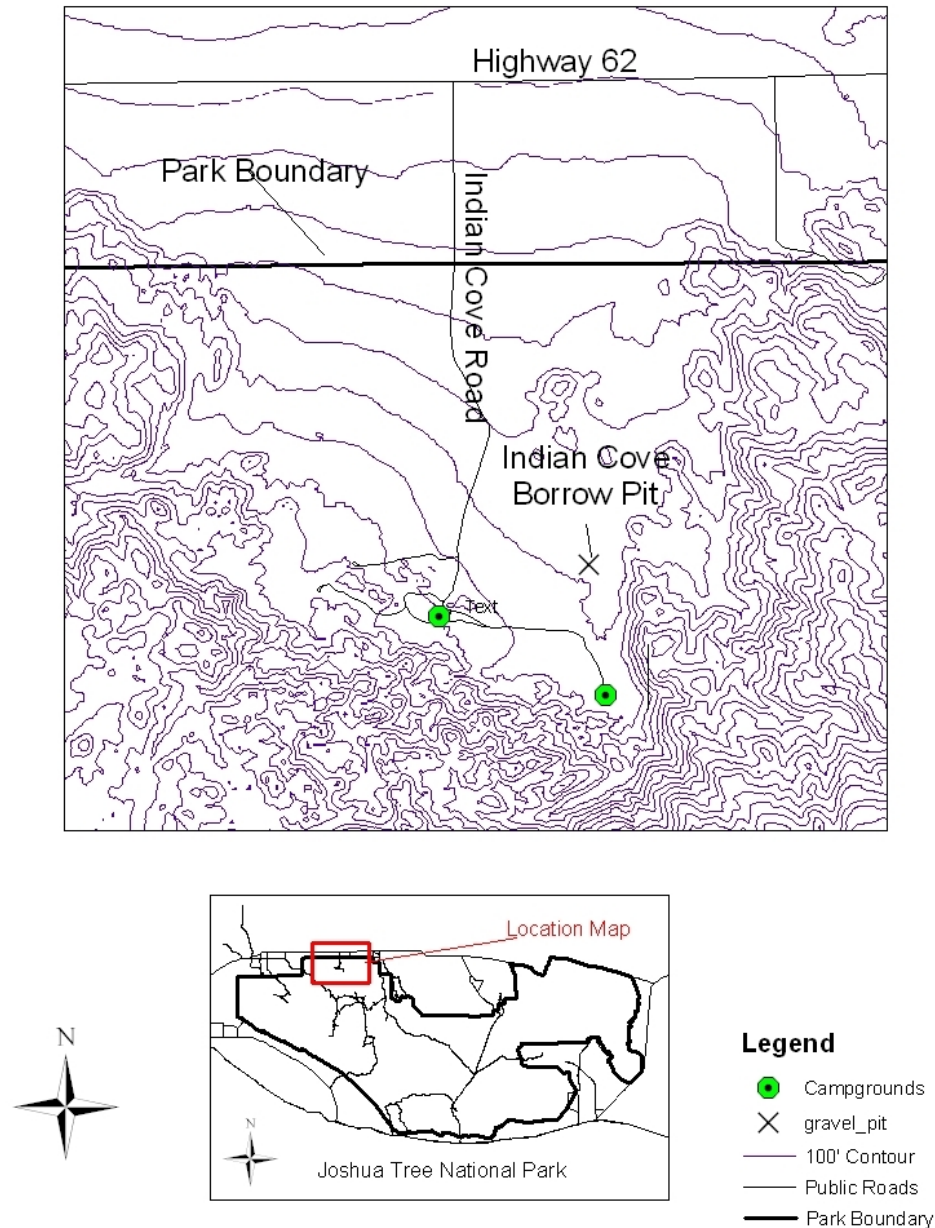
Reduce the visual scar left behind by excavation of sand and gravel and reestablish the natural vegetation and to restore the wildlife habitat that has been excluded from the site. The restoration of vegetation and wildlife and wildlife habitat includes, but not limited to, rare plant species and desert tortoise.

Comply with mandated, policy and recommendations set forth by National Park Service Policy, the Resource Management Plan 1999 and the General Management Plan 1995.

SCOPING

Public scoping is an effort to involve agencies and the general public in determining the issues that should be addressed in an environmental assessment. Scoping enables the National Park Service to determine important issues and eliminate issues with no relevance. Additionally, the process allows interdisciplinary team members and/or other participating agencies to identify related projects, associated documents and any necessary permits required for the preparation of this document. Scoping provides an opportunity for early input by any agency or interested public.

On February 17, 2005 a public scoping letter went out to scientists, environmental organizations and local Native American Tribes. Additionally, consultation with the U.S. Fish and Wildlife Service for a biological opinion was initiated in August of 2004. Of the 41 letters sent out for public comment, one response was received from a Native American Tribe relating to proper procedures if a burial is encountered during the project. Aside from this issue, no concerns or issues were raised, and no other alternatives were proposed.



Map 1. Vicinity of Project in relation to Joshua Tree National Park.

IMPACT TOPICS

Issues and concerns affecting the proposed action were identified by specialists in the National Park Service. Impact topics are the resources of concern that could be affected by the range of alternatives. Specific impact topics were developed to ensure that alternatives were compared on the basis of the most relevant topics. The following impact topics were identified on the basis of federal laws, regulations, orders, and National Park Service Management Policies, 2001. A brief rationale for the selection of each impact topic is given below, as well as the rationale for dismissing specific topics from further consideration.

GEOLOGY, TOPOGRAPHY AND HYDROLOGY

Any project that involves earthmoving equipment, transport of soil grading or re- contouring may have an impact to geologic features, topography or hydrologic function. Therefore this topic has been included for analysis by this report.

SOILS

As described in the aforementioned topic, projects involving earthmoving equipment, soil transport grading and re- contouring have an impact relating to soils. Therefore this topic has been included for analysis in this report

AIR QUALITY

The Clean Air Act of 1970 (as amended 1990) requires the National Park Service to protect parks' air quality. National Park Service Management Policies call for air resource management to be integrated into National Park Service operations and planning, and for all air pollution sources within parks to comply with federal, state, and local air quality regulations. The generation of fugitive dust is anticipated with this project. However, an overall a long- term benefit is also associated with the project. Therefore this topic has been included for analysis in this report

VEGETATION

The proposed action involves importation of material to the Indian Cove site. Anytime material is imported to a new site the risk of spreading exotics species must be considered. Additionally, with implementation any of the action alternative, some vegetation will need to be removed salvaged and replanted. Therefore this topic has been included for analysis by this report.

WILDLIFE

As a result of implementation of any of the action alternatives impacts (beneficial and adverse) to wildlife are anticipated. Therefore this topic has been included for analysis by this report.

SPECIES OF SPECIAL CONCERN

The Endangered Species Act of 1973 mandates an examination of impacts on all species on the federal list of threatened or endangered species. A federally listed species that may be potentially affected by the proposed action is the desert tortoise (*Gopherus agassizii*). Additional species of concern include the LeConte's Thrasher and rare vegetation. Therefore this topic has been included for analysis by this report.

CULTURAL RESOURCES

The National Historic Preservation Act of 1966 (as amended), NEPA, NPS Management Policies (2001), NPS- 2 (Planning Process Guideline), and NPS- 28 (Cultural Resource Management) call for the consideration of archeological and other cultural resources in planning proposals. The

Indian Cove borrow pit area has previously been inventoried for cultural resources and is known to contain at least two known sites adjacent to the proposed undertaking and at least ten other sites within the general vicinity of the project. Therefore this topic was included in the detailed analysis of this report.

IMPACT TOPICS DISMISSED FROM FURTHER CONSIDERATION

Issues and concerns affecting this project were identified by National Park Service specialists, as well as from the input of other federal, state, and local agencies. After this scoping, issues and concerns were distilled into distinct impact topics to facilitate the analysis of environmental consequences, which allows for a standardized comparison between alternatives based on the most relevant information. The impact topics were identified on the basis of federal laws, regulations, and orders; National Park Service Management Policies (1999); and National Park Service knowledge of limited or easily impacted resources. The rationale for dismissing specific topics from further consideration is given below.

PRIME AND UNIQUE FARMLANDS

In August 1980, the Council on Environmental Quality (CEQ) directed that federal agencies must assess the effects of their actions on farmland soils classified by the U.S. Department of Agriculture's Natural Resources Conservation Service (NRCS) as prime or unique. Prime or unique farmland is defined as soil that particularly produces general crops such as common foods, forage, fiber, and oil seed; unique farmland produces specialty crops such as fruits, vegetables, and nuts. None of the soils in the project area are identified in this manner. Therefore, the topic of prime and unique farmlands was dismissed as an impact topic in this document.

SOCIOECONOMIC ENVIRONMENT

The proposed action would neither change local and regional land use nor impact local businesses or other agencies. The project area would be closed to park visitors for a period of two to four weeks in the middle of the summer (i.e. low visitation season), which would have negligible impacts upon park visitation. Therefore, socioeconomic environment will not be addressed as an impact topic in this document.

ENVIRONMENTAL JUSTICE

Executive Order 12898, "General Actions to Address Environmental Justice in Minority Populations and Low- Income Populations," requires all federal agencies to incorporate environmental justice into their missions by identifying and addressing disproportionately high and adverse human health or environmental effects of their programs and policies on minorities and low- income populations and communities. The proposed action would not have disproportionate health or environmental effects on minorities or low- income populations or communities as defined in the Environmental Protection Agency's Environmental Justice Guidance (1998). Therefore, environmental justice was dismissed as an impact topic in this document.

WILDERNESS EXPERIENCE

The National Park Service wilderness management policies are based on statutory provisions of the Organic Act of 1916 and the Wilderness Act of 1964. The 2001 National Park Service Management Policies require the administration of National Park Service managed wilderness areas for the use and enjoyment of the American people in such a manner that will leave them unimpaired for future generations. Both the Indian Cove borrow pit and the Underhill borrow pit and associated service roads are outside of wilderness boundaries. Therefore the wilderness experience was dismissed from detailed analysis of this report.

SCENIC AND RECREATIONAL VALUES

Providing for visitor enjoyment is one of the fundamental missions of the National Park Service, according to the Organic Act of 1916 and the 2001 National Park Service Management Policies (2001). Both the Indian Cove borrow pit and the Underhill borrow pit are in remote locations and are not anticipated to have an impact on scenic or recreational values.

VISITOR EXPERIENCE

During the months of operation (July through August) visitation will be minimal at the Indian Cove campgrounds. Additionally, the number of trucks running between the source site and the Indian Cove site will be no more than 5 with an hour between trucks. This level of construction traffic will be insignificant with the overall operations of the Indian Cove camping facility.

WATER QUALITY

Quality and quantity of both ground and surface water remain a point of concern in the high desert environment that encompasses Joshua Tree National Park. Naturally occurring surface water is rare in the park. There are more than 120 known water sources, including springs, seeps, wells, and one short perennial stream. The proposed project or alternatives are not anticipated to have any impact on water quality.

ALTERNATIVES

In completing this scoping and development of this environmental assessment, the National Park Service identified three action alternatives to meeting the goals of the project. Below are descriptions of the alternatives, including the option of not taking any action on the site. There is a preferred alternative that was used as the proposed undertaking for completing the NHPA §106 compliance procedures. It defines the rationale for the action in terms of resource protection and management, visitor and operational use, costs, and other applicable factors. All actions described in the preferred alternative are consistent with the approved General Management Plan (1994) and related park documents.

NO ACTION ALTERNATIVE

The No Action Alternative describes the action of continuing the present management operation and condition; it does not imply or direct discontinuing the present action or removing existing uses, developments, or facilities. The No Action Alternative provides a basis for comparing the management direction and environmental consequences of the proposed action and must always be considered in every environmental assessment. Should the No Action Alternative be selected, the National Park Service would respond to future needs and conditions associated with the Indian Cove borrow pit without major actions or changes in course.

Under the No- Action Alternative, the site would continue to exist in its present condition as a maintenance storage yard. To prevent vehicles from encroaching beyond the existing impacted area, the gate will remain locked or other natural- material barriers would be placed where needed.

ACTIONS COMMON TO ALL ACTION ALTERNATIVES

The following actions are common to all action alternatives and are included here to demonstrate the similarity of the action alternatives. Differences between the action alternatives are described in the next sections. Each action alternative contains the following activities:

- Existing debris or stored materials would be relocated to the Pinto Wye maintenance facility or taken to the appropriate refuse facility.
- Maintenance storage material and trash would be removed from the site to an approved disposal site.
- Asphalt paving would be removed using an excavator (Cat 325 tracked excavator or equivalent) or loader and trucked to appropriate dump facility.
- Areas to be backfilled would be ripped to a minimum depth of 18 inches, moisture conditioned and compacted with on- site material prior to placement of fill material.
- Rocks, duff, and vegetative debris would be hand- scattered.
- Site stabilization/restoration success would be monitored by a) establishing baseline data, b) documenting long- term resource responses (hydrologic, geomorphic and vegetative) to restoration actions, c) identifying exotic species invasion or erosion/sedimentation issues, and d) refining future restoration treatments based on documented successes and failures.

- Inboard or cut portion of road surface would be ripped to a depth of 1- 2 feet.
- Fill material would be removed from the outboard edge and placed in the road cut to recreate a natural slope angle and aspect. Through- cut areas of the road may be backfilled with material from the extraction area to bring road surface up to match the surrounding topography.
- The service road would be re- contoured to blend with surrounding topography. Access to the service road area will be blocked with rocks, a berm, and/or signs. All surface watercourses intersected by the road would be restored.
- A re- vegetation prescription would be applied as needed.
- Work zones would be identified and fenced with construction tape, snow fencing, or some similar material prior to any project activity. The fencing would define the construction zone and confine activity to the minimum area required for work. All protection measures would be clearly stated in the work specifications and workers would be instructed to avoid conducting activities beyond the work zone as defined by the work zone fencing.
- Temporary impacts associated with the project would occur, such as soil and vegetation disturbance and the possibility of soil erosion. Standard erosion control measures such as silt fences and/or sand bags would also be used to minimize any potential soil erosion. Silt fencing fabric would be inspected weekly or after every major storm. Accumulated sediments would be removed when the fabric is estimated to be approximately 75% full.
- Although soil side- cast during construction would be susceptible to some erosion, such erosion would be minimized by placing silt fencing around the excavated soil. Excavated soil may be used in the construction project; excess soil would be stored in approved areas.
- Re- vegetation plantings would use native species from genetic stocks originating in the park. Re- vegetation efforts would be to reconstruct the natural spacing, abundance, and diversity of native plant species. All disturbed areas would be restored as nearly as possible shortly after construction activities are completed. The principal goal is to avoid interfering with natural processes.
- In many areas soils and vegetation are already impacted to a degree by various human and natural activities. Vegetation impacts and potential compaction and erosion of bare soils would be minimized by conserving topsoil in windrows. The use of conserved topsoil would help preserve micro- organisms and seeds of native plants. The topsoil would be re- spread in as near as original location as possible, and supplemented with scarification, mulching, seeding, and planting with species native to the immediate area. This would reduce re- contouring scars and erosion.
- Some petrochemicals from construction equipment could seep into the soil. To minimize this possibility, equipment would be checked frequently to identify and repair any leaks.
- Should construction unearth previously undiscovered archeological resources, work would be stopped in the area of any discovery and the park would consult with the state historic preservation officer/tribal historic preservation officer and the Advisory Council on Historic Preservation, as necessary, according to §36 CFR 800.13, Post Review Discoveries. In the

unlikely event that human remains are discovered during construction, provisions outlined in the Native American Graves Protection and Repatriation Act (1990) would be followed.

- The National Park Service would ensure that all contractors and subcontractors are informed of the penalties for illegally collecting artifacts or intentionally damaging archeological sites or historic properties. Contractors and subcontractors would also be instructed on procedures to follow in case previously unknown archeological resources are uncovered during construction. Equipment traffic would be minimized to the area of the project site. Equipment and materials staging areas would also avoid known archeological resources.
- The flow of vehicle traffic on the road would be maintained as much as possible during the work period. Work delays would normally be limited to a few minutes at a time. There may be some periods when the nature of the construction work may require temporary road closures. All efforts would be made to reduce these as much as possible and to alert park staff as soon as possible if delays longer than normal are expected. Visitors would be informed of construction activities and associated delays. Traffic would be managed to ensure timely access to recreational sites in the Indian Cove area.
- Contractors would coordinate with park staff to reduce disruption in normal park activities. Equipment would not be stored along the roadway overnight without prior approval of park staff. Construction workers and supervisors would be informed about the special sensitivity of park values, regulations, an appropriate housekeeping.

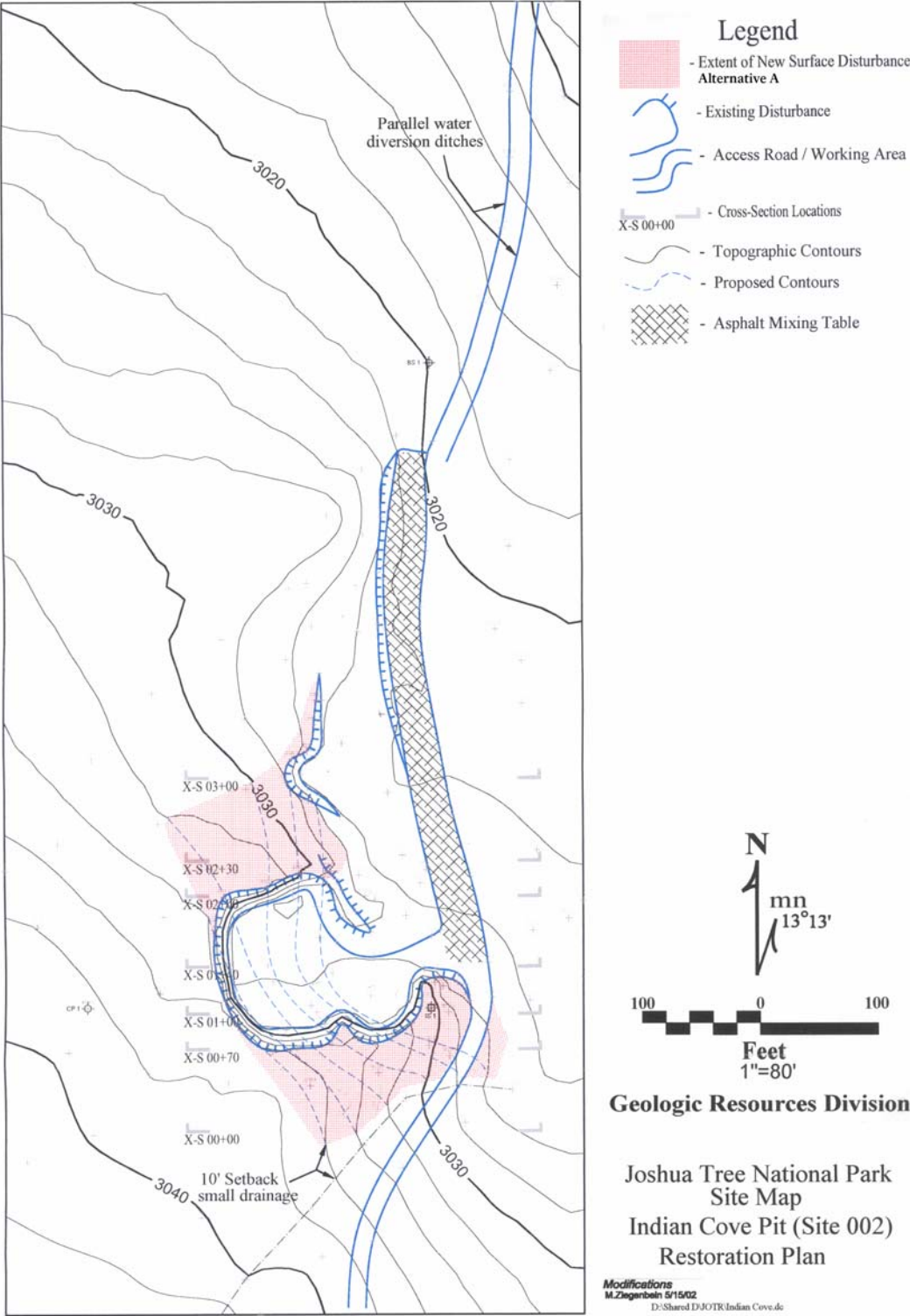
ALTERNATIVE 2- SITE ENHANCEMENT THROUGH RE-CONTOURING

Referred to as Alternative A in the Biological Assessment

This alternative would essentially re- contour the site and have virtually no new fill brought to the pit. The site would be cut to generate fill material followed by limited backfilling of the Indian Cove borrow pit and service road. The existing area of disturbance (pit, mixing table, service road) is 2 acres. The near vertical walls of the pit would be removed by placing fill material (from adjacent cut areas) in contact with the walls and re- grading the slope to a ratio of 2:1 (horizontal to vertical) or flatter. Some benching or removal of existing walls is anticipated to tie existing and fill material together. Areas within close proximity to the vertical walls will be used to generate fill material by cutting into the existing slope and re- grading to a lower elevation. Proposed new disturbance (topsoil salvage area and road disturbance area) would be 0.77 acres. Total area of disturbance for this alternative would be 2.77 acres. The re- vegetation area would be 2.77 acres.

The Indian Cove extraction pit and mixing table would be restored as follows:

- Salvage topsoil, plant materials, and vegetative debris from pit and mixing table.
- Salvage all soil (3"- 4" if present), surface material (1"- 3"), and duff from all new areas to be disturbed. Windrow material along edges of disturbance.
- Re- contour site as prescribed in the Indian Cove Site Restoration Diagram and Cross-Sections (NPS 2002) using D7 or D8 sized dozer.
- Spread salvage soil and growth medium over the disturbed area to a depth of 3".
- Apply re- vegetation prescription to the 2.77 acre disturbed area.



Map 2. Indian Cove Project Area

ALTERNATIVE 3- SITE RESTORATION USING IMPORTED MATERIAL

Referred to as Alternative B in the Biological Assessment

This alternative would involve the removal of approximately two feet of on- site material (to be used as finish grade material), major backfilling of the Indian Cove borrow pit using suitable material from an off- park extraction site, and re- contouring the site to pre- existing contours. This alternative will not require a topsoil salvage area at the site. The proposed new disturbance in the project area would be considerably less than Alternative 2. In lieu of cutting existing slopes to generate on- site fill material, , imported material from a local contractor will be used to backfill the Indian Cove borrow pit. Some minor benching at the Indian Cove borrow pit will still be required to tie existing and new fill material together; however, the maximum amount of benching will be tiered back in one foot high steps at a 1:1 slope ratio, requiring approximately 7 bench steps. The bench cutting is required to prevent a line of erosion between the existing native material and the imported fill material. Minor re- contouring of the pit, mixing table, and service road would take place as well. The existing area of disturbance (pit, mixing table, service road) is 2 acres and the new disturbance under this alternative would be less than 0.25 acres. The re- vegetation area would be 2.25 acres.

The Indian Cove extraction pit and mixing table would be restored as follows:

- Remove and stockpile approximately two feet of topsoil, plant materials, and vegetative debris from the pit only.
- Import material would be brought into the site from a local contractor
- Re- contour site as close to contour line conditions that were present before site was established.
- Apply re- vegetation prescription to the 2.25 acres of disturbed area at Indian Cove borrow pit.

ALTERNATIVE 4- SITE RESTORATION USING LOCALLY DERIVED PARENT MATERIAL

Environmentally Preferred alternative and referred to as Alternative B in the Biological Assessment

This alternative would involve the removal of approximately two feet of on- site material (to be used as finish grade material), major backfilling of the Indian Cove extraction pit using suitable material from a park extraction site, and re- contouring Indian Cove borrow pit to pre- existing contours. This alternative will not require a separate topsoil salvage area at the site. In lieu of cutting existing slopes to generate on- site fill material, materials from the National Park Service Underhill borrow pit (Map 2) will be removed and imported to the Indian Cove borrow pit.

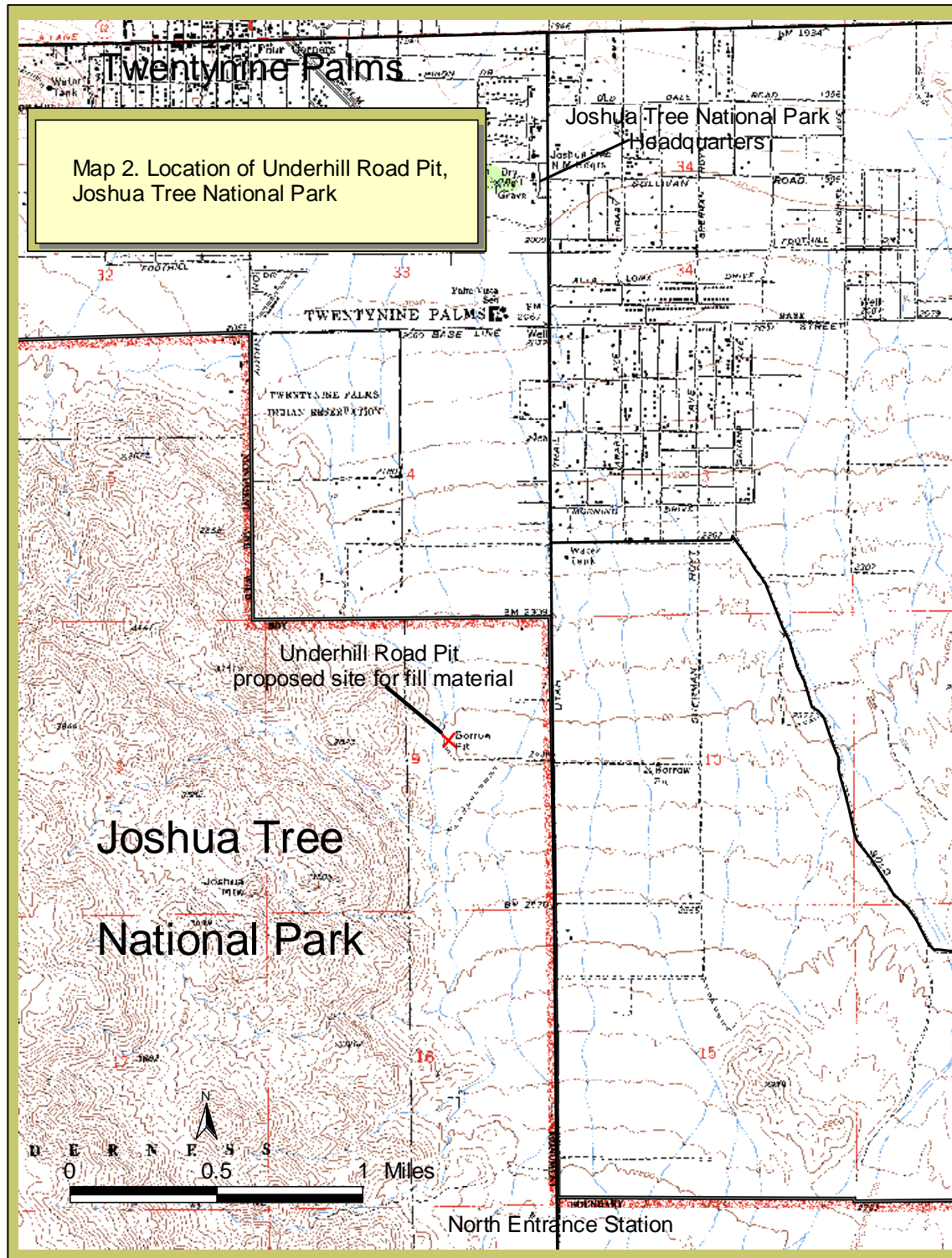
The Underhill borrow pit is a high- energy wash that has been reviewed by the fluvial morphologist with the Geologic Resource Division of the National Park Service in March 2004 (Gravel Pit Inventory and Restoration Recommendations, 2002). The National Park Service has determined that the material is suitable for extraction and the impacts to the wash will be negligible. The mineral content at the Underhill borrow pit is from the same parent mineral source as what is at the Indian Cove project area. Chemical weathering and breakdown rates of the Underhill material will occur in a manner similar to that found in Indian Cove. Another factor for selecting the Underhill borrow pit is that fines (soils) are not present in the wash due to high- energy water transport. This reduces the risk of exotic, invasive plant spread. This use is consistent with National Park Service Management Policies (2001) section 4.8.2.4 “Soil Resource Management.”

Bench cutting is required to tie existing and new fill material together; however, the maximum amount of benching will be tiered back in one foot high steps at a 1:1 slope ratio, requiring approximately 7

bench steps. This technique will prevent a line of erosion between the existing native material and the imported fill material. Minor re- contouring of the pit, mixing table, and service road would take place as well. The existing area of disturbance (pit, mixing table, service road) is 2 acres and new disturbance under this alternative (bench cutting and road disturbance area) would be 0.25 acres. Proposed new disturbance at the Underhill borrow pit (fill material extraction) would be 0.25 acres. Total area of new disturbance for this alternative would be 0.5 acres. The re- vegetation area would be 2 acres and would apply only to the Indian Cove borrow pit project area. The Underhill borrow pit is proposed for restoration at a later date since it may continue to be used as a source of suitable fill material for future gravel pit restoration projects.

The Indian Cove extraction pit and mixing table would be restored as follows:

- Remove and stockpile approximately two feet of topsoil, plant materials, and vegetative debris from the pit only.
- Backfill the extraction pit with suitable import material from the Underhill borrow pit. As the backfilling operation proceeds, bench cuts into existing vertical walls will be employed to tie existing and new fill material together. Surface disturbance as a result of bench cuts will vary depending on extraction pit wall height but is estimated to extend no more than 6' out from pit perimeter.
- Re- contour site as close to contour line conditions that were present before site was established.
- Apply re- vegetation prescription to the 2.25 acres of disturbed area at Indian Cove borrow pit.



Map 3. Underhill borrow pit in Alternative 4 (from Biological Assessment)

ENVIRONMENTALLY PREFERRED ALTERNATIVE

The National Park Service is required to identify an environmentally preferred alternative in environmental assessment or environmental impact statement. Identification of this alternative takes place after the environmental analysis is complete. The environmentally preferred alternative is the alternative that will promote the national environmental policy as expressed by NEPA.

The Council on Environmental Quality defines the environmentally preferred alternative as "...the alternative that will promote the national environmental policy as expressed in the National Environmental Policy Act's §101." Section 101 of the National Environmental Policy Act states that "...it is the continuing responsibility of the Federal Government to:

- (1) fulfill the responsibilities of each generation as trustee of the environment for succeeding generations;
- (2) assure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings;
- (3) attain the widest range of beneficial uses of the environment without degradation, risk to health or safety, or other undesirable and unintended consequences;
- (4) preserve important historic, cultural, and natural aspects of our national heritage, and maintain, wherever possible, an environment which supports diversity, and variety of individual choice;
- (5) achieve a balance between population and resource use which will permit high standards of living and a wide sharing of life's amenities; and
- (6) enhance the quality of renewable resources and approach the maximum attainable recycling of depletable resources."

Alternative 4, the environmentally preferred alternative, would provide would fully meet the requirements of policy 1, 2, 3, 4 & 6. However this alternative does not fully meet policy 5 due to the location of the borrow pit. Under this alternative, park resources would continue to be protected while providing opportunities the best opportunity for reestablishing wildlife habitat vegetation, and the natural fluvial and geologic processes. This alternative, therefore, strives to and meets policies 1- 6. However, this alternative does not meet policy 5.

Alternatives 1 and 2 only fully meet the requirements in policies 1 and 5. These alternatives do not meet the intent of policies 2 through 4 to the extent that the other alternatives do. Alternative 3 meets the requirements of policies 1, 2, & 6, but does not meet the requirements of policies 3, 4 & 5 to the extent that Alternative 4 does.

Table 1: Methods Each Alternative Uses to Ensure Each Objective Is Met

Objective	Alternative 1: No Action	Alternative 2: Re-contouring	Alternative 3: Site Restoration –Import Material	Alternative 4: Site Restoration – Parent Material
Reclaim, rehabilitate or completely restore the degraded borrow pit area. At a minimum, this action must establish a geologically and hydrologically stable landscape and control of human disturbances that are causing resource degradation.	'No action' will not meet the requirements of this objective.	Re-contouring will reclaim the site, but cannot fully restore the geologic and hydrologic function to the site	Alternative will fully restore the geologic and hydrologic function to the site by importing material and refilling the excavation.	
Restore native vegetation to this area and control any exotic/invasive species of vegetation.	'No action' will not meet the requirements of this objective.	Alternative 2 will provide a stable platform for re-vegetation; monitoring the site after re-vegetation for exotics will mitigate invasive species	Restoration of the site will return the topography to pre-existing condition and provide the best platform, and distribution of precipitation to allow for the re-vegetation of the site. Monitoring the site after re-vegetation for exotics will mitigate invasive species	Methods are similar to Alternative 3, except for the use of locally-derived material that has a lower risk of transmitting exotic invasive plant seeds into the project area.
Restoration of native vegetation to provide natural wildlife habitat that pre-existed prior to extraction activities.	'No action' will not meet the requirements of this objective.	Re-contouring will provide a more natural topographic environment. The re-introduction of native vegetation will provide the cover and a more natural looking environment for wildlife.	Restoration of the site will return the topography to pre-existing condition. This will provide the best platform, and distribution of precipitation to allow for the re-vegetation of the site. Restoration of the natural vegetation will provide the cover and vegetation for wildlife habitat	
Provide support (watering) to native vegetation until native species have been established.	'No action' will not meet the requirements of this objective.	Monitoring and removal of invasive species are included in this alternative.		
Meets National Park Service Management Policy, Resource Management Plan and the General Management Plan	'No action' will not meet the requirements of this objective.	Meets the Resource Management Plan, General Management Plan and National Park Service Management Policies		

Table 2: Comparison of impact by Alternatives

Resource	Alternative 1 No-Action	Alternative Recontouring	Alternative 3 Restoration –Import Material	Alternative 4 Restoration –Locally Derived Material
Geology, Topography and Hydrology	This alternative will result in long-term, moderate, adverse impacts to site topography and hydrology.	This alternative would result in a long term, moderate beneficial impact to topography and hydrology.	This alternative would result in long-term, major beneficial impacts to site topography and hydrology.	
Soils	This alternative will result in long-term, moderate adverse impacts to soils would continue.	This alternative would have a long-term, minor, beneficial impact to the site soils.	This alternative, using import material would provide a minor, long-term benefit relating to soils.	This alternative, using locally derived material will have a major, long-term beneficial impact to the Indian Cove borrow pit site and a minor, short-term minor impact to the Underhill borrow pit site with respect to soils.
Air Quality	This alternative will result in long-term adverse impacts are expected with respect to air quality.	This alternative would result in a minor, long-term, beneficial impact to air quality. During the grading operation at both sites, some fugitive dust is anticipated. The resulting impacts to air quality would be minor and short term.		
Vegetation	This alternative would constitute a long-term, minor, adverse impact to vegetation.	This alternative would constitute a long-term, moderate, beneficial impact to vegetation.	This alternative would constitute a major, long-term beneficial impact to site vegetation.	
Wildlife	This alternative would result in have negligible to minor, long-term, adverse impacts specifically related to the low quality of habitat.	This alternative would have minor, long-term beneficial impact to wildlife at the site as the area naturalized, vegetation established, and the habitat restored.		
Species of Special Concern	The No Action Alternative would have negligible to minor, long-term, adverse impacts specifically related to the low quality of habitat. Long-term, minor, adverse impacts to the LeConte's Thrasher would continue.	This alternative would have minor, long-term beneficial impact to tortoise at the site as the area naturalized, vegetation established, and the habitat restored. This alternative would result in a long-term, moderately beneficial impact to the LeConte's Thrasher.	Alternative 4 would be a have short term negligible to minor adverse impacts on tortoise behavior during the time and shortly after the site construction activities. This alternative would have minor, long-term beneficial impact to tortoise at the site as the area naturalized, vegetation established, and the habitat restored. This alternative would result in a long-term, moderately beneficial impact to the LeConte's Thrasher.	

Rare Vegetation	Long-term, minor, adverse impacts to the rare vegetation would continue.	This alternative would result in a long-term, minor beneficial impact to rare vegetation.
Cultural Resources	Impacts would be minor and long-term.	This alternative would result in long-term, minor, and beneficial indirect impacts to cultural resources.

ENVIRONMENTAL CONSEQUENCES

METHODOLOGY

Potential impacts are described in terms of type (are the effects beneficial or adverse?), context (are the effects site- specific, local, or even regional?), duration (are the effects short- term, lasting less than one year, or long- term, lasting more than one year?), timing (is the project seasonally timed to avoid adverse effects), and intensity (are the effects negligible, minor, moderate, or major). Because definitions of intensity (negligible, minor, moderate, or major) vary by impact topic, intensity definitions are provided separately for each impact topic analyzed in this environmental assessment/assessment of effect.

In addition, National Park Service's Management Policies, 2001 require analysis of potential effects to determine whether or not actions would impair park resources. The fundamental purpose of the national park system, established by the Organic Act and reaffirmed by the General Authorities Act, as amended, begins with a mandate to conserve park resources and values. National Park Service managers must always seek ways to avoid, or to minimize to the greatest degree practicable, adversely impacting park resources and values. However, the laws do give the National Park Service the management discretion to allow impacts to park resources and values when necessary and appropriate to fulfill the purposes of a park, as long as the impact does not constitute impairment of the affected resources and values. Although Congress has given the National Park Service the management discretion to allow certain impacts within park, that discretion is limited by the statutory requirement that the National Park Service must leave park resources and values unimpaired, unless a particular law directly and specifically provides otherwise. The prohibited impairment is an impact that, in the professional judgment of the responsible National Park Service manager, would harm the integrity of park resources or values. An impact to any park resource or value may constitute impairment, but an impact would be more likely to constitute impairment to the extent that it has a major or severe adverse effect upon a resource or value whose conservation is:

- necessary to fulfill specific purposes identified in the establishing legislation or proclamation of the park;
- key to the natural or cultural integrity of the park; or
- identified as a goal in the park's general management plan or other relevant National Park Service planning documents.
- Impairment may result from National Park Service activities in managing the park, visitor activities, or activities undertaken by contractors and others operating in the park. A determination on impairment is made for each natural and cultural resource impact topic.

CUMULATIVE IMPACT SCENARIO

The Council on Environmental Quality (CEQ) regulations, which implement the National Environmental Policy Act of 1969 (42 USC 4321 et seq.), require assessment of cumulative impacts in the decision- making process for federal projects. Cumulative impacts are defined as "the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non- federal) or person undertakes such other actions" (40 CFR 1508.7). Cumulative impacts are considered for both the no- action and preferred alternatives. Cumulative impacts were determined by combining the impacts of the preferred alternative (re- contouring the project area with material derived from within the park followed by re- vegetation) with other past, present, and reasonably foreseeable future actions. Therefore, it was

necessary to identify other ongoing or reasonably foreseeable future projects at Joshua Tree National Park and, if applicable, the surrounding region. Future development for the Indian Cove area is unclear at this time. Residential development outside of the park may require the park to look at developing alternative management strategies for the Indian Cove area.

IMPACTS TO CULTURAL RESOURCES

This environmental assessment discusses potential effects to cultural resources, as analyzed in a separate NHPA §106 document (Orbann 2004). In the current document impacts are described in terms of type, context, duration, and intensity, which is consistent with the regulations of the Council on Environmental Quality (CEQ) that implement the National Environmental Policy Act (NEPA).

CEQ regulations and the National Park Service's Conservation Planning, Environmental Impact Analysis and Decision-making (Director's Order #12) also call for a discussion of the appropriateness of mitigation, as well as an analysis of how effective the mitigation would be in reducing the intensity of a potential impact, e.g. reducing the intensity of an impact from major to moderate or minor. Any resultant reduction in intensity of impact due to mitigation, however, is an estimate of the effectiveness of mitigation under NEPA only. It does not suggest that the level of effect as defined by §106 is similarly reduced. Although adverse effects under §106 may be mitigated, the effect remains adverse.

GEOLOGY, TOPOGRAPHY, AND HYDROLOGY

AFFECTED ENVIRONMENT

The borrow pit is within ½ mile from the Rattlesnake Canyon where two prominent geologic features are juxtaposed (Queen Mountain porphyry and the White Tank Monzonite). At no time during the operation of the extraction pit, was bedrock exposed or excavated. The nearest geologic feature to the site is a braided stream bed that receives runoff from Rattlesnake canyon during the winter and summer months of precipitation. Extraction from the borrow pit, has created vertical walls approximately 7 feet high. The unnatural topography of the extraction pit has resulted in erosion of the vertical walls and a concentrated stream of runoff from the pit/mixing table area to the drainage. The result is a turbulent flow of water and sediments to an area of unintended deposition. Additionally and an accelerated rate of erosion between the mixing table and the braided streambed.

METHODOLOGY

This section is intended to augment the impact analysis for natural systems and processes, by analyzing specific impacts of the proposed management alternatives upon geology, topography, and hydrologic resources. Visitor use and park operations impacts to watershed dynamics were used to identify the intensity of the impacts.

The predicted intensity of adverse impacts is articulated according to the following criteria:

- *Negligible:* An action that could result in a change to a natural physical resource, but the change would be so small that it would not be of any measurable or perceptible consequence.
- *Minor:* An action that could result in a change to a natural physical resource, but the change would be small and localized and of little consequence.
- *Moderate:* An action that would result in a change to a natural physical resource; the change would be measurable and of consequence.

- **Major:** An action that would result in a noticeable change to a natural physical resource; the change would be measurable and result in a severely adverse or major beneficial impact.

A short term impact is one in which natural processes would allow recovery of a condition in less than 3 years. A long term impact is one in which natural processes would allow recovery of a condition more than 3 years from project completion.

REGULATIONS AND POLICY

Current laws and policies require that the following conditions be achieved for geologic features in the park:

Desired Condition	Source
Park Geologic features, which include geologic processes will be protected and monitored if necessary to prevent or stop human caused damage.	National Park Service Management Policies (2001), National Park Service Director's Order 77 (1991)

IMPACTS OF THE ALTERNATIVES

Alternative 1: No- Action

Under the No- Action Alternative, unnatural self- draining topography, including the 7- foot high walls would remain. Precipitation on these barren areas would result in rapid runoff, thus remaining unavailable for the establishment of vegetation. Heavy precipitation and associated runoff would continue to create unnatural sediment loading in areas of unintended deposition. This would continue to bury or remove the natural vegetation. Without re- vegetation and re- grading to previously existing natural grade erosion between the braided stream and the extraction pit would continue indefinitely. Unnatural, accelerated erosion and sedimentation occurring at the site would continue. The No- Action Alternative will result in long- term, moderate, adverse impacts to site topography and hydrology.

Alternative 2: Site Enhancement Re- contouring

Under Alternative 2 Site Enhancement and Re- contouring, the vertical walls of the pit would be removed by flattening or sloping back and filling where necessary. This will be accomplished by removing material in some areas and filling in other areas with no net gain or loss of existing material. The overall result of this operation would be a flatter (less steep) slope grade to mitigate water concentration and flow during rainy periods. Alternative 2 would result in moderate hydrological control by promoting a sheetflow over gentle slopes. However, Alternative 2 the natural surface hydrology would not be completely restored. This alternative would result in a long term, moderate beneficial impact to topography and hydrology.

Alternative 3: Site Restoration using Import Material

Under Alternative 3 site restoration would completely reestablish the pre- existing natural grade, thereby restoring the natural fluvial or hydrologic processes that existed prior to extraction pit operations. Since the material would be derived from external sources there is no other hydrologic or geologic areas of concern associated with this alternative. Alternative 4 would result in long- term, major beneficial impacts to site topography and hydrology.

Alternative 4: Site Rehabilitation; Locally Derived Material –Preferred Alternative

Site rehabilitation under Alternative 4 would have the same hydrologic benefit as Alternative 3. Under Alternative 4 material would be locally derived from the Underhill borrow pit. The natural site topography and vegetation would decrease runoff rates, thereby increasing

infiltration and the availability of precipitation to the site. Thus, Alternative 4 would result in long- term, major beneficial impacts to site topography and hydrology. Impacts to the high-energy wash where the fill material will be derived are considered short- term and minor.

CONCLUSION

The geologic, topographic, and hydrologic resources of Joshua Tree National Park are minimally impacted by recreational activities and from development of transportation systems in the park (i.e. roads and trails). Past development in the park has resulted in the disturbance and degradation of some resources.

Reasonable foreseeable future actions at the park, such as restoration of borrow pits, would be designed to minimize the impacts to geologic, topographic and hydrologic resources. Because this project is designed to minimize impacts to these resources during implementation of the preferred alternative, the preferred alternative would not be anticipated to contribute to the cumulative impacts of other past and reasonably foreseeable future actions.

Based on the foregoing, the Park's geologic, topographic, and hydrologic resources would not be impaired by actions proposed under any of the alternatives.

SOILS

AFFECTED ENVIRONMENT

Topsoil was removed from the extraction pit many decades ago. Undisturbed soils around the site remain intact. Within the extraction pit area, transport by water (during heavy rainy periods) has winnowed out much of the fine- grained material. This is a result of the unnatural free- draining topography of the extraction pit.

METHODOLOGY

This section is intended to augment the impact analysis for natural systems and processes, by analyzing specific impacts of the proposed management alternatives upon soils.

The predicted intensity of adverse impacts is articulated according to the following criteria:

Negligible: Soils would not be affected or the effects to soils would be below or at the lower levels of detection. Any effects to soil productivity or fertility would be slight and no long- term effects to soils would occur.

Minor: The effects to soils would be detectable. Effects to soil productivity or fertility would be small, as would the area affected. If mitigation were needed to offset adverse effects, it would be relatively simple to implement and would likely be successful.

Moderate: The effect on soil productivity or fertility would be readily apparent, likely long- term, and result in a change to the soil character over a relatively wide area. Mitigation measures would probably be necessary to offset adverse effects and would likely be successful.

Major: The effect on soil productivity or fertility would be readily apparent, long- term, and substantially change the character of the soils over a large area in and out of the monument. Mitigation measures to offset adverse effects would be needed, extensive, and their success could not be guaranteed.

A short term impact is one in which natural processes would allow recovery of a condition in less than 3 years. A long term impact is one in which natural processes would allow recovery of a condition more than 3 years from project completion.

REGULATIONS AND POLICY

Current laws and policies require that the following conditions be achieved for soils in the park:

Desired Condition	Source
The National Park Service will actively seek to understand and preserve the soil resources of the park and to prevent to the extent possible, the unnatural erosion, physical removal, contamination or its contamination of other resources. Resource manager will create, where appropriate, detailed soil maps, define the distribution of soils series, determine the physical and chemical characteristic. Potential impacts on soil resources will be monitored. Management action will be taken to mitigate adverse, potentially irreversible, impacts on soil by heavy visitor use and facilities. Where ever practical plants will be salvaged for reuse in restoration site restoration. All efforts will be made to prevent the introduction of exotic species.	National Park Service Management Policies (2001), National Park Service Director's Order 77 (1991)

IMPACTS OF THE ALTERNATIVES

Alternative 1: No- Action

Under Alternative 1, the small amount of natural soil that remains on the site would be subject to continued rapid erosion from wind, summer thundershowers, and winter precipitation. Adjacent areas of undisturbed soil would also be subject to accelerated erosion by slope failure of the vertical walls, and concentrated runoff from the borrow pit. Under the No- Action Alternative, long- term, moderate adverse impacts to soils would continue.

Alternative 2: Site Enhancement – Re- contouring

Under Alternative 2, new disturbance of topsoil is projected to be almost an acre (0.77- acre). In the area of new disturbance the topsoil will be salvaged and stockpiled for reuse, however, soil distribution of the stockpiled material over the newly contoured area will be a very thin mantle. A high probability exist that short- term erosion may carry reused topsoil and duff material, during periods of high precipitation, prior to establishment of new vegetation. Overall, Alternative 2 would have a long- term, minor, beneficial impact to the site.

Alternative 3: Site Restoration using Import Material

Under Alternative 3 the natural hydrologic function would be restored to a pre- existing or natural condition mitigating unnatural soil erosion. However, a Class II base material would likely be used as import to reduce the risk of importing exotic species. Since the material would be derived from an exterior source there would be no benefit from weathering processes unless the source material is similar to the chemical and physical properties of the on- site material. This alternative would provide a minor, long- term benefit relating to soils.

Alternative 4: Site Restoration; Locally Derived Material - Preferred Alternative

Site restoration under Alternative 4 would restore the natural topography and hydrologic function mitigating soil erosion. The materials for this alternative would be derived from the Underhill borrow pit (a high- energy wash). The material from this wash is a mixture of sand and cobbles that has been winnowed of the fine soils by water transportation. The chemical and physical properties of the source materials are similar to the chemical and physical properties found at Indian Cove. Weathering processes acting on the source materials would generate a soil type similar to the soil type found at Indian Cove. This alternative will have a major, long- term beneficial impact to the Indian Cove borrow pit site and a minor, short- term minor impact to the Underhill borrow pit site with respect to soils.

CONCLUSIONS

The soils of Joshua Tree National Park are minimally impacted by recreational activities and from development of transportation systems in the park (i.e. roads and trails). Past development in the park has resulted in the disturbance and degradation of some resources.

Reasonable foreseeable future actions at the park, such as restoration of borrow pits, would be designed to minimize the impacts to soils. Because this project is designed to minimize impacts to these resources during implementation of the preferred alternative, the preferred alternative would not be anticipated to contribute to the cumulative impacts of other past and reasonably foreseeable future actions.

Based on the foregoing, the Park's soil resources would not be impaired by actions proposed under any of the alternatives.

AIR QUALITY

AFFECTED ENVIRONMENT

Joshua Tree National Park is a Class I air quality area. Joshua Tree National Park is usually one of the top three parks in the nation regarding air quality issues. The primary concern is with fugitive dust that results from windy conditions and from vehicle traffic accessing the pit area during maintenance activities. The amount of fugitive dust generated at the extraction pit is generally low due to the infrequent use of pit by maintenance personnel. However, it is anticipated that some fugitive dust will be generated during the restoration project.

METHODOLOGY

This section is intended to augment the impact analysis for natural systems and processes, by analyzing specific impacts of the proposed management alternatives upon air quality.

The predicted intensity of adverse impacts is articulated according to the following criteria:

Negligible: No changes would occur or changes in air quality would be below or at the level of detection, and if detected, would have effects that would be considered slight and short- term.

Minor: Changes in air quality would be measurable, although the changes would be small, short- term, and the effects would be localized. No air quality mitigation measures would be necessary.

Moderate: Changes in air quality would be measurable, would have consequences, although the effect would be relatively local. Air quality mitigation measures would be necessary and the measures would likely be successful.

Major: Changes in air quality would be measurable, would have substantial consequences, and be noticed regionally. Air quality mitigation measures would be necessary and the success of the measures could not be guaranteed.

A short term impact is one that natural processes allow recovery in 7 days or less. A long term impact is one that natural processes take more than 7 days to recover.

REGULATIONS AND POLICY

Current laws and policies require that the following conditions be achieved for air quality in the

park:

Desired Condition	Source
National Park Service will seek to perpetuate the best air quality in parks to 1) protect natural resources, 2) preserve cultural resources, 3) sustain visitor enjoyment, human health, visibility water quality wildlife, historic and most other elements of a park environment sensitive to air pollution. Inventory air quality related values associated with each park. Monitor and document the condition of air quality and related values. Evaluate air pollution and identify causes. Minimize air quality pollution emissions associated with park operations. Insure healthful indoor air quality in National Park Service facilities.	National Park Service Management Policies (2001), National Park Service Director's Order-77 (1991). Clean Air Act 1970 (amended 1990).

IMPACTS OF THE ALTERNATIVES

Alternative 1: No- Action

Fugitive dust would continue to be generated at the borrow pit by wind and vehicle traffic. Relative to unpaved roads in the region, the borrow pit is a minor source of this air pollutant. Under the No- Action alternative minor, long- term adverse impacts are expected with respect to air quality.

Alternative 2: Site Enhancement - Recontouring

Under Alternative 2, future vehicles would be excluded from the site, thereby eliminating one source of fugitive dust. Recontouring will provide a more stable platform to restore native vegetation. Once the vegetation has been reestablished, the exposed soil subjected to wind erosion will be reduced. This alternative would result in a minor, long- term, beneficial impact to air quality. During the grading operation some fugitive dust is anticipated. Mitigation efforts (i.e., water truck) during the grading operation will be employed to reduce fugitive dust during recontouring. The resulting short- term impacts to air quality would be negligible.

Alternative 3: Site Restoration using Import Material

Under Alternative 3 import material will be brought into the site from an exterior location. The site will be graded and contoured to the pre- existing natural condition. Once the vegetation has been reestablished, the exposed soil subjected to wind erosion will be reduced. This alternative would result in a moderate, long- term, beneficial impact to air quality. During the grading operation some fugitive dust is anticipated. Mitigation efforts (i.e., water truck) during the grading operation will be employed to reduce fugitive dust during recontouring. The resulting short- term adverse impacts to air quality would be negligible.

Alternative 4: Site Restoration; Locally Derived Material - Preferred Alternative

Under Alternative 4 locally derived material (from within the park), will be brought into the Indian Cove borrow pit. The site will be graded and contoured to the pre- existing natural condition. Once the vegetation has been reestablished, the exposed soil subjected to wind erosion will be reduced. This alternative would result in a moderate, long- term, beneficial impact to air quality. During the grading operation at the Indian Cove site and the Underhill site some fugitive dust is anticipated. Mitigation efforts (i.e., water truck) during the grading

operations at both locations will be employed to reduce fugitive dust during recontouring. The resulting short- term adverse impacts to air quality at both sites would be negligible.

CONCLUSIONS

The air resources of Joshua Tree National Park are impacted by smog that is brought to the park by prevailing winds from the Los Angeles area. To some extent the air resources are minimally impacted by activities and from development of transportation systems in the park (i.e. roads and trails). Past development in the park has resulted in the disturbance and degradation of some resources.

Reasonable foreseeable future actions at the park, such as restoration of borrow pits, would be designed to minimize the impacts to air quality. Because this project is designed to minimize impacts to these resources during implementation of the preferred alternative, the preferred alternative would not be anticipated to contribute to the cumulative impacts of other past and reasonably foreseeable future actions.

Based on the foregoing, the Park's air resource would not be impaired by actions proposed under any of the alternatives.

VEGETATION

AFFECTED ENVIRONMENT

The predominate native vegetation around the site, *Larrea tridentata*- *Ambrosia dumosa* (Creosote bush- Burrobush) dominates the area of the proposed action. *Galleta* (*Hilaria rigida*) and Mojave yucca (*Yucca schidigera*) were two other dominant species in this area. Immediately to the east of the site (20- 50 ft) is the north- south running Rattlesnake/Johnson Spring Wash, a high- energy wash system dominated by thick stands of Desert willow (*Chilopsis linearis*). Steep, rocky slopes are located 0.16 mile to the east of the site and were dominated by Mojave yucca and Burrobush.

The Underhill site consists primarily of Cat's Claw (*Acacia greggii*), Bladder- pod (*Isomeris arborea*), and Desert lavender (*Hyptis emoryi*) in the wash area and Creosote, Mojave yucca, and Burrobush on the upland service roads and ramps.

METHODOLOGY

This section is intended to augment the impact analysis for natural systems and processes, by analyzing specific impacts of the proposed management alternatives upon vegetation.

The predicted intensity of adverse impacts is articulated according to the following criteria:

Negligible: No native vegetation would be affected or some individual native plants could be affected as a result of the alternative, but there would be no effect on native species populations. The effects would be short- term, on a small scale, and no species of special concern would be affected.

Minor: The alternative would affect some individual native plants and would also affect a relatively minor portion of that species' population. Mitigation to offset adverse effects, including special measures to avoid affecting species of special concern, could be required and would be effective.

Moderate: The alternative would affect some individual native plants and would also affect a sizeable segment of the species' population in the long- term and over a relatively

large area. Mitigation to offset adverse effects could be extensive, but would likely be successful. Some species of special concern could also be affected.

Major: The alternative would have a considerable long- term effect on native plant populations, including species of special concern, and affect a relatively large area in and out of the monument. Mitigation measures to offset the adverse effects would be required, extensive, and success of the mitigation measures would not be guaranteed.

A short term impact is one in which natural processes would allow recovery of a condition in less than 3 years. A long term impact is one in which natural processes would allow recovery of a condition more than 3 years from project completion.

REGULATIONS AND POLICY

Current laws and policies require that the following conditions be achieved for vegetation the park:

Desired Condition	Source
The National Park Service will seek to perpetuate native plant life as a part of the natural ecosystem. Landscape plants may be manipulated to maintain habitat for threatened and endangered species. In natural zones only native plants may be used if additional plantings are done, and manipulation of existing plants will be carried out in a manner designed to restore and enhance the functioning of the plant and animal community of which the endangered species is a natural part.	National Park Service Management Policies (2001), National Park Service Director's Order 77 (1991), Endangered Species Act.

IMPACTS OF THE ALTERNATIVES

Alternative 1: No- Action

Under the No- Action Alternative, the borrow pit would continue to be used as a maintenance storage facility and would not be revegetated. The continued exclusion of native vegetation from the site and the continued exposure of the site to invasion by weeds would constitute a long-term, minor, adverse impact to vegetation.

Alternative 2: Site Enhancement - Recontouring

Under Alternative 2, some additional areas of native vegetation disturbance are anticipated. In order to recontour the site without importing any new fill, approximately .77 acres of existing vegetation will be removed and salvaged for reuse. Planting under Alternative 2 would reestablish a native plant community on the recontoured site. As necessary, appropriate site treatments to prevent the establishment and spread of invasive weeds would also be undertaken. This would constitute a long- term, moderate, beneficial impact to vegetation.

Alternative 3: Site Restoration Using Imported Material

Under Alternative 3, only a minor amount of native vegetation disturbance is anticipated. In order to tie the new fill into the existing vertical slopes some benching will be required. However, less than .25 of an acre of new disturbance is anticipated. Additional impacts may result from the importation of exotic species, since the material will be derived from external sources. The spread of exotic vegetation by importing material will be mitigated as outlined in chapter 2. Restored native flora would blend with the surrounding vegetation over time, creating a dynamic native plant community. This would constitute a major, long- term beneficial impact to site vegetation.

Alternative 4: Site Restoration; Locally Derived Material - Preferred Alternative

Under Alternative 4, Some minor native vegetation disturbance is anticipated at both sites.

However, less than 0.5 acre of new disturbance is anticipated. Impacts from the spread of exotic vegetation are will be mitigated, as outlined in Chapter 2. Native plants established on the site would blend with the surrounding vegetation over time, creating a dynamic native plant community. This would constitute a major, long- term beneficial impact to site vegetation.

CONCLUSIONS

The vegetation resources of Joshua Tree National Park are impacted by smog that is brought to the park by prevailing winds from the Los Angeles area. The vegetation resources are minimally impacted by activities and from development of transportation systems in the park (i.e. roads and trails). Past development in the park has resulted in the disturbance and degradation of some resources.

Reasonable foreseeable future actions at the park, such as restoration of borrow pits, would be designed to minimize the impacts to vegetation. Because this project is designed to minimize impacts to these resources during implementation of the preferred alternative, the preferred alternative would not be anticipated to contribute to the cumulative impacts of other past and reasonably foreseeable future actions.

Based on the foregoing, the Park's vegetation resources would not be impaired by actions proposed under any of the alternatives.

WILDLIFE

AFFECTED ENVIRONMENT

Wildlife generally avoid the impacted area of the extraction pit due to the lack of cover/protection from natural vegetation and soft topsoil for burrowing animals. However, it is estimated that approximately 350 vertebrate species inhabit the park. Large mammals in the area include desert bighorn sheep. The most common smaller mammals include the mouse and wood rat species, white- tailed antelope ground squirrel, chipmunk, pocket gopher, coyote, black- tailed jackrabbit, and cottontail rabbit. There are seven species of lizard and thirteen species of snake that inhabit the Indian Cove area, most of which are ground- dwelling. Over 270 species of birds live in or fly through the park, which is adjacent to a major migratory flyway in the Coachella Valley. The Indian Cove area has a relatively rich avifauna, including a year-round population of LeConte's thrashers, black- throated sparrows, verdins, mourning doves, mockingbirds, cactus wrens, and representative samples of most resident species. A number of species migrate into the area during the spring and stay until fall to nest and fledge their young, including ash- throated flycatchers and horned larks.

METHODOLOGY

This section is intended to augment the impact analysis for natural systems and processes, by analyzing specific impacts of the proposed management alternatives upon wildlife.

The predicted intensity of adverse impacts is articulated according to the following criteria:

Negligible: Wildlife would not be affected or the effects would be at or below the level of detection, would be short- term, and the changes would be so slight that they would not be of any measurable or perceptible consequence to the wildlife species' population.

Minor: Effects to wildlife would be detectable, although the effects would be localized, and would be small and of little consequence to the species' population. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

Moderate: Effects to wildlife would be readily detectable, long- term and localized, with consequences at the population level. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.

Major: Effects to wildlife would be obvious, long- term, and would have substantial consequences to wildlife populations in the region. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.

A short term impact is one in which natural processes allow for recovery of wildlife disturbances in less than 1 year. A long term impact is one in which recovery by natural processes takes more than 1 year to occur.

REGULATIONS AND POLICY

Current laws and policies require that the following conditions be achieved wildlife in the park:

Desired Condition	Source
Native wildlife populations are preserved and restored to their natural abundances, diversities, dynamics, distributions, habitat and behaviors. Native wildlife populations are restored in parks when they have been extirpated by past human-caused actions. Human impacts on native animals (individuals and populations) and the processes that sustain them are minimized.	National Park Service Management Policies 2001, National Park Service Director's Order 77

IMPACTS OF THE ALTERNATIVES

Alternative 1: No- Action

Under the No- Action Alternative, the borrow pit would continue to be used as maintenance storage facility. The disturbed area would not be restored. The natural topography, surface hydrology, vegetation, and habitat would continue to be disrupted. The current condition of the site does provide habitat and wildlife (small mammals, birds, lizards and snakes) do use the site. However, the site is considered to be degraded habitat. The No Action Alternative would have negligible to minor, long- term, adverse impacts specifically related to the low quality of habitat.

Alternative 2: Site Enhancement - Recontouring

Recontouring of the borrow pit under Alternative 2 would establish a more natural looking topography, improved surface hydrology, and native vegetation of the site. Over time, ecological processes would be returned to near pre- disturbance conditions. Wildlife that use the area would benefit from the improved food and cover on the site. Alternative 2 would be a have short term negligible to minor impacts on wildlife behavior during the time and shortly after the site construction activities. This alternative would have minor, long- term beneficial impact to wildlife at the site as the area naturalized, vegetation established, and the habitat restored.

Alternative 3: Site Restoration Using Imported Material

Restoration of the borrow pit under Alternative 3 would reestablish the natural pre- existing topography, surface hydrology, and native vegetation to the site. Wildlife that use the area, would benefit from the improved food and cover on the site. Alternative 3 would be a have short term negligible to minor impacts on wildlife behavior during the time and shortly after the site construction activities. This alternative would have minor, long- term beneficial impact to wildlife at the site as the area naturalized, vegetation established, and the habitat restored.

Alternative 4: Site Restoration; Locally Derived Material - Preferred Alternative

Restoration of the borrow pit under Alternative 4 would reestablish the natural pre-existing topography, surface hydrology, and native vegetation to the site. Similar to Alternatives 2 and 3, wildlife that use the area, would benefit from the improved food and cover on the site.

Alternative 4 would have short term negligible to minor impacts on wildlife behavior during the time and shortly after the site construction activities. This alternative would have minor, long-term beneficial impact to wildlife at the site as the area naturalized, vegetation established, and the habitat restored.

CONCLUSIONS

Wildlife resources of Joshua Tree National Park are impacted by smog that is brought to the park by prevailing winds from the Los Angeles area. Other impacts to wildlife resources result from development of transportation systems (i.e. roads and trails), campgrounds and visitor facilities. Past development in the park has resulted in the disturbance and degradation of some resources.

Reasonable foreseeable future actions at the park, such as restoration of borrow pits, would be designed to minimize the impacts to wildlife. Because this project is designed to minimize impacts to these resources during implementation of the preferred alternative, the preferred alternative would not be anticipated to contribute to the cumulative impacts of other past and reasonably foreseeable future actions.

Based on the foregoing, the Park's wildlife resources would not be impaired by actions proposed under any of the alternatives.

SPECIES OF SPECIAL CONCERN

AFFECTED ENVIRONMENT

Desert Tortoise

Karl (1988) estimated that the highest tortoise densities in Joshua Tree National Park tend to occur in "creosote bush scrub where the topography was flat or rolling and the soil was fine-gravelly with or without boulder outcrops and scattered large gravel and cobbles". The majority of the habitat surrounding the project area fits this description. Tortoise populations have been estimated in many areas of JOTR (Barrow 1979, Karl 1988, Freilich et al 2000) but no population surveys have been done in the Indian Cove area. The Panorama Heights area of the park, located six miles to the west, and with almost identical habitat characteristics as Indian Cove, was surveyed for tortoises in 1991 and 1994. The best average Schnabel estimates from that work was 63 tortoises/km², which is considered a moderate to high density. The Indian Cove population is likely to have similar densities.

In the past, Indian Cove has served as one of JOTR's main tortoise radio-tracking sites. At least ten animals were radio-tracked until 2000 and many more have been historically tracked or monitored in the area. An unknown but large number of pet or captured tortoises are known to have been released in the Indian Cove area over the past 45 years (JOTR park records).

The Underhill borrow pit (proposed in Alternative 1 for fill material source) is within desert tortoise habitat but no population surveys have been done in this area. A National Park Service site inspection done in June 1998 reported a tortoise and active burrow present in the wash containing the sandpit. Caliche rock shelves are present along wash banks, offering potential

den sites to tortoises. Tortoise sightings reported by park visitors and staff along a three mile stretch of the main north- south running park road 0.34 miles to the east of this site average 8- 10 per year, indicating that moderate densities are present in this area.

LeConte's Thrasher

The Indian Cove area contains a population of LeConte's thrasher, a California State Species of Concern and a Partners in Flight Watch List species. LeConte's thrashers are a non- migratory species with a limited range throughout the southwestern United States. The core of its range is in the California portion of the Mojave Desert, but nowhere throughout its range is it common. Densities even in optimum habitat are five pairs or less per square mile (Sheppard 1970), an extremely low density for any passerine bird. Many areas with seemingly suitable habitat lack this species (Remsen, Cardiff, and Cardiff MS).

Rare Plants

Joshua Tree National Park has 48 rare plant species that are protected under National Park Service- 77 Natural Resource Management policies. The Indian Cove area contains one rare perennial plant species and has potential habitat for a rare annual. Each of these species were former federal candidate species; with recent changes to the U.S. Fish and Wildlife species lists, these two species were reduced to species of special concern. Neither are currently listed as candidate species, but both have sensitive status with state and California Native Plant Society lists.

Linanthus maculata is a former federally listed candidate species. It is a small annual herb that grows in very loose soft sand on low benches along washes, particularly in areas where the species does not have to compete with other plants. Major threats to *Linanthus maculata* include habitat loss, recreational activities, and off- highway vehicle use. Joshua Tree National Park remains one of the last protected habitats for this species. Because of development, most of the populations outside the park within the Coachella Valley have been extirpated. The California Native Plant Society has listed this species on the rB List (rare, threatened, or endangered in California and elsewhere) with a RED code of 3- 1- 3 (Rarity: distributed in one to several highly restricted occurrences or present in such small numbers that it is seldom sited, Endangerment: endangered in a portion of its range, Distribution: endemic to California).

Monardella robisonii is a formerly federally listed candidate species. Rock pennyroyal, as the species is commonly known, is typically restricted to rocky, granitic slopes at moderate elevations, usually from 3400- 4900 feet. A Joshua Tree National Park rare plants survey in the fall of 2001 found 17 new locations of the species in the Indian Cove management area, at elevations as low as 3200 feet. The habitat of *Monardella robisonii* is almost entirely in and around granitic boulders. Threats to this species include recreational activities. The California Native Plant Society has listed this species on the rB List (rare, threatened, or endangered in California and elsewhere) with a RED code of 3- 1- 3 (Rarity: distributed in one to several highly restricted occurrences or present in such small numbers that it is seldom sited, Endangerment: not endangered, Distribution: endemic to California).

Both the Indian Cove borrow pit and the Underhill borrow pit will be surveyed for both *Monardella robisonii* and *Linanthus maculatus* prior to the onset of any grading operation. However, preliminary surveys of both areas did not reveal either of the rare species. In addition, no known populations occur within the import zone. See Appendix B for a complete list of rare plant species in the park.

METHODOLOGY

This section is intended to augment the impact analysis for natural systems and processes, by analyzing specific impacts of the proposed management alternatives upon wildlife.

The predicted intensity of adverse impacts is articulated according to the following criteria:

Negligible: Wildlife would not be affected or the effects would be at or below the level of detection, would be short- term, and the changes would be so slight that they would not be of any measurable or perceptible consequence to the wildlife species' population.

Minor: Effects to wildlife would be detectable, although the effects would be localized, and would be small and of little consequence to the species' population. Mitigation measures, if needed to offset adverse effects, would be simple and successful.

Moderate: Effects to wildlife would be readily detectable, long- term and localized, with consequences at the population level. Mitigation measures, if needed to offset adverse effects, would be extensive and likely successful.

Major: Effects to wildlife would be obvious, long- term, and would have substantial consequences to wildlife populations in the region. Extensive mitigation measures would be needed to offset any adverse effects and their success would not be guaranteed.

A short term impact is one in which natural processes allow for recovery of wildlife disturbances in less than 1 year. A long term impact is one in which recovery by natural processes takes more than 1 year to occur.

REGULATIONS AND POLICY

Current laws and policies require that the following conditions be achieved for species of special concern in the park:

Desired Condition	Source
Species of special concern populations are preserved, restored and recovered to their natural abundances, distributions, and habitats. Manage designated critical habitat, essential habitat, and recovery areas are maintained and enhanced to improve recovery of the listed species. Off-road vehicle travel is limited; speed of vehicles is reduced; littering is minimized, and feral dogs are controlled.	National Park Service Management Policies, National Park Service Director's Order 77, Endangered Species Act, Desert Tortoise Recovery Plan 1994.

IMPACTS OF THE ALTERNATIVES

Desert Tortoise Surveys

Presence- Absence surveys for this project were conducted in the Indian Cove borrow pit project area from June 24 to July 1st 2004. The techniques applied in these surveys were based on information from Field survey protocol for any federal action that may occur within the range of the desert tortoise (USFWS 1992), and Guidelines for Handling Desert Tortoises (DTC 1999). By referencing the site map, which included estimated extent of new surface disturbance, an Arcview GIS shapefile was created for the project area. Employing this file, parallel belt- transects were created at 100, 300, 600, 1200, and 2400- foot distances ('Zone of Influence' distances recommended in USFWS 1992) from the project's perimeter using the create buffers tool (Map 3). In the project footprint a 30ft adjoining buffer zone was examined using 100% survey techniques (USFWS 1992). Belt- transects were navigated with a Compaq iPAQ pocket PC with GPS capabilities (accuracy 2- 5m) using Arcpad 6.0i mapping software. Classification of tortoise signs (burrows, scat, and shells) was based on USFWS (1992) information index for desert tortoise sign.

One possible tortoise burrow, one adult female tortoise shell, and thirteen scats were found. No desert tortoises were found in either the 100% coverage area (i.e. 30- foot construction footprint zone) or along the zones of influence transects. A class- 5 (good condition- possibly tortoise) burrow was found 14 feet to the west of the project site's mixing table. No other tortoise signs were found within the 30- foot construction footprint zone. One class 5 scat was found on the 300- foot zone of influence line. A class- 5 scat was located while traveling between the 300- foot and 600- foot zone of influence lines. On the 1200- foot zone of influence line a class- 4 (shell bone falling apart; growth rings on scutes peeling) female tortoise shell was found. Also found along this line were two class- 3 scat and one class- 4 scat. On the 2400- foot zone of influence line two class- 2 scat and six class- 3 scat were found.

As stated in Field survey protocol for any federal action that may occur within the range of the desert tortoise (USFWS 1992), the survey time period for presence/absence surveys is limited to the active period of the desert tortoise, March 25 to May 31. The survey for this project was conducted in the last week of June. Joshua Tree National Park's wildlife branch (responsible for conducting surveys) received project details in mid- June 2004. Three main points were considered in choosing to do these surveys in late June:

- 1) The project's proposed start date of July 2005
- 2) This is a small- scale restoration project which will likely result in more beneficial rather than adverse effects to tortoises and tortoise habitat.
- 3) Based on park records, telemetry data, and survey results from similar areas close- by, the park previously concluded that tortoise densities are moderate to high in the project area.

The presence/absence survey results further supports the probability that there are moderate to high tortoise populations present within the project area. The large north- south running wash system immediately to the east of the site, which is comprised of large stands of desert willow as well as wide (15- 20 feet) sections of open, sandy areas, can be considered marginal habitat and is likely an area that tortoises commonly move across but do not reside in.

A biological opinion evaluating the action alternatives was issued by the U.S. Fish and Wildlife Service with the statement 'likely to adversely effect'. The National Park Service was issued a take permit under Section 9 of the Endangered Species Act. Restoration of habitat under the action alternatives would mitigate the short term adverse effects to the desert tortoise.

LeConte's thrasher

No scientific studies of LeConte's thrashers have been conducted in the Indian Cove area so reliable population estimates are not available. Informal nest surveys carried out over the last 20 years suggest that portions of the Indian Cove area have nesting densities of LeConte's thrashers that may approach optimum levels.

Field surveys for LeConte's thrasher nests located in proximity to the proposed Indian Cove equestrian trails were carried out in September and October of 2002. Nesting activities typically occur from January to June so no active nests were found. LeConte's thrashers typically nest in large silver chollas (*Opuntia echinocarpa*) or pencil chollas (*Opuntia ramossissima*), or other dense shrubs such as jojoba (*Simmondsia chinensis*). Nests are usually located 2- 6 feet off the ground. They are cup- shaped and are relatively loose aggregations of sticks. Nests are sometimes reused in subsequent years.

For the no action alternative, there would be a long term negligible adverse impact, since the

species is expected to have adjusted to the current disturbed condition. For the action alternatives, there would be short term impacts that would be negligible because restoration activities will occur after breeding season. Long term impacts would minor and beneficial due to habitat restoration.

Rare Plants

Preliminary surveys of both areas did not reveal either of the rare species. In addition, no known populations occur within the import zone. See Appendix B for a complete list of rare plant species in the park. There will be no adverse impacts to the rare species, though minor long term beneficial impacts may occur due to habitat restoration activities.

CONCLUSIONS

Species of Special Concern at Joshua Tree National Park are impacted by smog that is brought to the park by prevailing winds from the Los Angeles area. Other impacts include development of transportation systems in the park (i.e. roads and trails), campgrounds and visitor facilities. Past development in the park has resulted in the disturbance and degradation of some resources.

Reasonable foreseeable future actions at the park, such as restoration of borrow pits, would be designed to minimize the impacts to species of special concern. Because this project was designed to minimize impacts to these resources during implementation of the preferred alternative, the preferred alternative would not be anticipated to contribute to the cumulative impacts of other past and reasonably foreseeable future actions.

Based on the foregoing, the Park's species of special concern would not be impaired by actions proposed under any of the alternatives.

ARCHEOLOGICAL RESOURCES

AFFECTED ENVIRONMENT

The National Historic Preservation Act of 1966 (as amended), NEPA, NPS Management Policies, NPS- 2 (Planning Process Guideline), and NPS- 28 (Cultural Resource Management Guidelines) call for the consideration of cultural resources in planning proposals. An archeological inventory and NHPA §106 assessment of effects has previously been completed (Orbann 2004) and will be summarized in this section.

At the time of European contact, the boundaries of three Native American groups – the Cahuilla, Chemehuevi, and Serrano – intersected at a point now in the park. The Cahuilla occupied southern and southwestern portions of the park; the Chemehuevi eastern portions; and the Serrano, northern and northwestern portions, including the area now known as Indian Cove (Bean 1978; Bean and Smith 1978; Bean and Vane 2002). The Mojave utilized especially the eastern areas of the park and were also known to travel through the park on a regular basis. Descendants of these peoples continue to live in the region and maintain cultural interests in the park. There are ongoing requests from Native Americans to gather plants for traditional uses and for visits to the park's curatorial facility to examine ethnographic items and archeological artifacts. The possibility exists of sacred sites being identified within the park (Schneider 1992) which would make consultation necessary. The major ongoing Native American concern relates to the possibility of discovering human remains; cremations have been found in the park in the past (Schroth 1992). The need would then exist to follow through with prompt notification and consultation with the neighboring tribes. The park staff, in concert with Native Americans, successfully completed repatriation of the remains of several Native Americans and associated

grave goods in June 1992. This was done in accordance with the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA), which would govern any future NPS action in this regard.

Archeological and historic resources in the region of Joshua Tree National Park may reflect as much as 11,000 years of human use and occupation. This generalization has been made in the park's general management plan (NPS 1996). Such a statement is based upon the work of National Park Service archeologists, as well as those outside the agency, some of whom have done contract work for the park. Examples in the literature include NPS reports of 1975, 1985, and 1992. Other works are those of Elizabeth Campbell (1931), Elizabeth Campbell and William Campbell (1935), William Wallace (1964), Claude Warren and Joan Schneider (1992, 1993, 2000), and Adella Schroth (1994).

Specific archeological works dealing with Indian Cove and Underhill Road include those of George Kritzman (1967), Richard Ervin (1985), Claude Warren and Joan Schneider (1993), Jan Sabala (2002), and Carolyn Orbann (2004). The proximity of sites to the proposed borrow pit project, and the potential impacts to the sites resulting from the proposal and its alternatives, will be examined in this EA.

Native American occupation in the Indian Cove and Underhill Road area falls in the late prehistoric period, from about A.D. 1000 to perhaps historic times. Camps and rock shelters comprise the range of habitation sites. Other site types are food processing areas, lithic and ceramic scatters, and rock art. The park is well known for its pottery finds—vessel-bound food and water caches have been discovered in caves and crevices throughout the park, including the Indian Cove region. Milling equipment abounds and was used to grind plant and animal materials. No evidence has yet been found in the Indian Cove or Underhill Road area that would indicate an occupation earlier than A.D. 1000. This period, from A.D. 1000 to historic times, coincides with the greatest estimated overall occupation of the region now encompassed by Joshua Tree National Park, judging from the frequency of sites dating from within the last thousand years (NPS 1991, 1992).

Historic remains from the early and mid- 1900s have been found in the Indian Cove and Underhill Road areas as well. These remains include dirt track roads, house and other structural remains, and trash dumps (Sabala 2002).

In June and July of 2004 the Indian Cove and Underhill borrow pits and areas of potential effect were inventoried for cultural resources. An archeological clearance and §106 assessment of effects was written and signed by the park superintendent on September 20, 2004. Procedures for conducting §106 compliance follow the guidelines prescribed in the Programmatic Agreement among the National Park Service (U.S. Department of Interior), the Advisory Council on Historic Preservation, and the National Conference of State Historic Preservation Officers, specifically section VIII. A summary of the field results is presented below.

During course of the Indian Cove and Underhill Borrow pit inventory and assessment (Orbann 2004) one historic site, two historic isolates, and two prehistoric isolates were newly identified and recorded. Local hearsay also points to the fact that the Sullivan Brothers (Pudge and Harry) Gravel Pit was in the general area of the NPS Underhill Road gravel pit prior to the park utilizing the area for fill material. The historic materials were all identified in the area off Utah Trail and the prehistoric materials were identified in the Indian Cove unit, although previous research reveals historic materials in the Indian Cove area as well. The archeological survey document by

Orbann (2004) also contains a NHPA §106 assessment of effects on cultural resources from the proposed project, as summarized below. The information from the isolated finds has been recorded and does not need to be considered further.

CA- SBR- 11,708H is in the vicinity of the Underhill Borrow Pit and contains three historic features in a 2,400 square meter area. Feature 1 is a concrete foundation, Feature 2 is a disarticulated stone and mortar structure, and Feature 3 is a trash dump. This site may be the remains of an historic homestead belonging to Imogene Marshall, the daughter of Thaddeus Aaron, the owner of the Aaron bakery to the north. There are many diagnostic artifacts at the site including historic sanitary seam tin cans and Duraglass, Clorox bleach, and other bottle glass fragments. These artifacts plus information from two maps, one dated May 18, 1935 and the other dated 1955, indicate a use period ranging from the 1930s through the mid 1950s. Feature 1 has good integrity, Feature 2 shows signs of disturbance, possibly due to earthmoving equipment, and Feature 3 is mostly undisturbed. Erosion along drainages is having an effect on this site and in general it is in fair condition. The northern boundary of the site is located about 300 feet (100m) south of the access road to Underhill Road borrow pit and would not be impacted by this project.

Isolate 1 is a pile of historic cans, bottle glass, and ceramic fragments located along the dirt road leading to the Underhill Road borrow pit by north entrance. This isolate showed evidence of burning and disturbance, possibly by heavy machinery. Finding this isolate lead to the discovery of nearby CA- SBR- 11708H and the two are probably related.

Isolate 2 is a grey quartzite core/chopper tool discovered in the Indian Cove project area. Isolate 3 is a grey quartzite flake located in the Indian Cove project area. Isolate 4 is a stone and dirt platform or landing located at the end of the dirt road adjacent to the Underhill Road borrow pit in the north entrance project area. This platform is most likely related to the functioning of the NPS borrow pit, which is not considered historically significant. This is based on Linda Greene's National Register assessment of roads in the park, and the fact that the borrow pits are most likely mainly associated with the road system (Greene 1983:411).

Two previously recorded sites in the Indian Cove area were relocated during this survey and it was determined that they are directly adjacent to the Indian Cove borrow pit access road. CA- SBR- 10,823H is an historic dirt track road depicted on a 1937 map. The southern portion of the Indian Cove borrow pit access road was part of this dirt track but has been bulldozed, retains no integrity, and was not recorded as part of the historic road. The recorded segment of this road, which does retain its integrity, abuts the borrow pit access road that is scheduled to be reclaimed.

CA- SBR- 10,829H is a ca. 1930's historic trash scatter on the west side of the drainage exiting Rattlesnake Canyon. There is a sparse scatter of artifacts on the terrace and a small deposit eroding out of the cut- bank. Since the original recording in 2002 there has been substantial damage to the deposit in the cut- bank, likely due to water activity, and little integrity remains at the site.

The two isolated artifacts recorded during the Indian Cove equestrian survey (Sabala 2001) that are in the Indian Cove borrow pit area were not relocated during the current field work.

METHODOLOGY

Certain important research questions about human history can only be answered by the actual

physical material of cultural resources. Archeological resources have the potential to answer, in whole or in part, such research questions. In order for an archeological resource to be eligible for the National Register of Historic Places it must meet one or more of the following criteria of significance: A) associated with events that have made a significant contribution to the broad patterns of our history; B) associated with the lives of persons significant in our past; C) embody the distinctive characteristics of a type, period, or method of construction, or represent the work of a master, or possess high artistic value, or represent a significant and distinguishable entity whose components may lack individual distinction; D) have yielded, or may be likely to yield, information important in prehistory or history. In addition, the archeological resource must possess integrity of location, design, setting, materials, workmanship, and feeling, association (National Register Bulletin, Guidelines for Evaluating and Registering Archeological Properties). For purposes of analyzing impacts to archeological resources either listed in or eligible to be listed in the National Register, the thresholds of change for intensity of an impact are defined below:

Negligible impact is at the lowest levels of detection with neither adverse nor beneficial consequences. The determination of effect for §106 would be no adverse effect.

Adverse: disturbance of a site(s) results in little, if any, loss of integrity. The determination of effect for §106 would be no adverse effect. Beneficial: maintenance and preservation of a site(s). The determination of effect for §106 would be no adverse effect.

Minor

Adverse: disturbance of a site(s) results in loss of integrity. The determination of effect for §106 would be adverse effect. A memorandum of agreement is executed among the National Park Service and applicable state or tribal historic preservation officer and, if necessary, the Advisory Council on Historic Preservation in accordance with 36 CFR 800.6(b). Measures identified in the MOA to minimize or mitigate adverse impacts reduce the intensity of impact under NEPA from minor to negligible. Beneficial: stabilization of a site(s). The determination of effect for §106 would be no adverse effect.

Moderate

Adverse: disturbance of a site(s) results in loss of integrity. The determination of effect for §106 would be adverse effect. Measures to minimize or mitigate adverse impacts cannot be agreed upon and the National Park Service and applicable state or tribal historic preservation officer and/or Advisory Council are unable to negotiate and execute a memorandum of agreement in accordance with 36 CFR 800.6(b). Beneficial: active intervention to preserve a site(s). The determination of effect for §106 would be no adverse effect.

Major

Adverse: disturbance of a site(s) diminishes the significance and integrity of the site(s) to the extent that it is no longer eligible to be listed in the National Register. For purposes of Section 106, the determination of effect would be adverse effect. Beneficial: active intervention to preserve the site. For purposes of §106, the determination of effect would be no adverse effect.

REGULATIONS AND POLICIES

Current laws and policies require that the following conditions be achieved in the park:

Desired Condition	Source
Archeological sites are identified and inventoried, and their significance is determined and documented	National Historic Preservation Act; Executive Order 11593; Archeological and Historic Preservation Act;
Archeological sites are protected in an undisturbed condition unless it is determined through formal processes that disturbance or natural deterioration is unavoidable	Archeological Resources Protection Act; the Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation; Programmatic Memorandum of Agreement Among the NPS,

In those cases where disturbance or deterioration is unavoidable, the site is professionally documented and salvaged.

Advisory Council on Historic Preservation, and the National Council of State Historic Preservation Officers (1995); NPS Management Policies, NPS Director's Order 28 (Cultural Resource Management Guidelines).

IMPACTS OF ALTERNATIVES

Alternative 1: No- Action

Under the No- Action Alternative, the unnatural topography of the Indian Cove borrow pit would continue to exist within the Indian Cove area. Erosion associated with the borrow pit would continue the threat of indirect impacts to downstream archeological sites. These adverse impacts of the No- Action Alternative to cultural resources could be negligible, long- term, and indirect.

Alternative 2: Site Enhancement - Recontouring

Restoration of the borrow pit under Alternative 2 would partially restore the pit's natural topography and vegetation. In addition, the road would be rehabilitated and vehicles would be excluded from the immediate area. Existing accelerated erosion associated with the borrow pit would be reduced following restoration and downstream archeological sites would be better protected from erosion. Implementation of Alternative 2 would result in minor, long- term, beneficial indirect impacts to cultural resources.

Alternative 3: Site Restoration Using Import Material

Alternative 3 would include re- contouring of the 7- foot high walls, more closely blending the pit with the surrounding topography, and erosion control measures, including revegetation on the periphery of the pit.

In addition, the road would be rehabilitated and vehicles would be excluded from the immediate area. Implementation of Alternative 3 would result in minor, long- term, beneficial indirect impacts to cultural resources.

Alternative 4: Site Restoration – Locally Derived Material – Preferred Alternative

Rehabilitation of the Indian Cove borrow pit under Alternative 4 would substantially reestablish natural topography and native vegetation over the pit and road. Existing accelerated erosion associated with the borrow pit would be greatly reduced under this alternative. The use of fill material from the Underhill borrow pit would not cause any adverse effects to cultural resources in that area. Implementation of Alternative 4 would result in minor, long- term, beneficial indirect impacts to cultural resources.

CONCLUSION

Archeological resources at Joshua Tree National Park are subject to damage from vandalism, visitor access, and natural processes. Past development in the park has resulted in the disturbance and loss of some archeological resources during excavation and construction activities.

Reasonably foreseeable future actions at the park, such as restoration of borrow pits, could disturb undiscovered archeological resources. If significant archeological resources are inadvertently discovered and could not be avoided, the data they possess regarding prehistoric and/or historic lifeways would be documented and recovered, in consultation with the California State Historic Preservation Office. If Native American remains were to be inadvertently discovered the park would follow the Discovery Plan, already in place at the park

(see Appendix A). The impacts to such archeological resources would be adverse and range in intensity from minor to moderate, depending upon the scope of the potential actions, as well as the significance of any affected resources.

Because significant archeological resources, if discovered, would be avoided during implementation of the preferred alternative, the preferred alternative would not be anticipated to contribute to the cumulative impacts of other past and reasonably foreseeable future actions on archeological resources.

The Park's archaeological resources would not be impaired by actions proposed under any of the alternatives.

IMPAIRMENT STATEMENT

Because there would be no adverse impacts to any resource or value whose conservation is (1) necessary to fulfill specific purposes identified in the establishing legislation or proclamation of Joshua Tree National Park; (2) key to the natural or cultural integrity of the park; or (3) identified as a goal in the park's general management plan or other relevant National Park Service planning documents, there would be no impairment of the park's resources or values.

CONSULTATION and COORDINATION

FEDERAL, STATE AND LOCAL AGENCIES

U.S. Fish and Wildlife Service

INDIAN TRIBES

Agua Caliente Band of Cahuilla Indian, Palm Springs
 Cabazon Band of Cahuilla Mission Indians, Indio, CA
 Chemehuevi Indian Tribe, Havasu, CA
 Colorado River Indian Tribe, Parker, CA
 Fort Mojave Indian Tribe, Needles, CA
 Morongo Band of Cahuilla Mission Indians, Banning, CA
 Torres- Martinez Band of Mission Indians, Thermal , CA
 Twentynine Palms Band of Mission Indians, Coachella, CA

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LIST OF RECIPIENTS

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service, Ventura and Reno Offices
 National Park Service, Mojave National Preserve
 Bureau of Land Management, Palm Springs, CA
 U.S. Fish and Wildlife Service

INDIAN TRIBES

Agua Caliente Band of Cahuilla Indian, Palm Springs
 Cabazon Band of Cahuilla Mission Indians, Indio, CA
 Chemehuevi Indian Tribe, Havasu, CA
 Colorado River Indian Tribe, Parker, CA
 Fort Mojave Indian Tribe, Needles, CA
 Morongo Band of Cahuilla Mission Indians, Banning, CA
 Torres- Martinez Band of Mission Indians, Thermal , CA
 Twentynine Palms Band of Mission Indians, Coachella, CA

STATE AND LOCAL AGENCIES

California Department of Fish and Game
 California Department of Transportation
 Joshua Tree Municipal Advisory Council
 City of Twentynine Palms
 Town of Yucca Valley
 California Welcome Center, Yucca Valley, CA

ORGANIZATIONS

Bat Conservation International, Austin, TX

Cultural Committee of Colorado River Indians
National Hispanic Environmental Council
Sierra Club, Palm Springs, CA
Sonoran Institute, Tucson, AZ
La Rona Jojoba Co.

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APPENDIX A: Discovery Plan

If Native American Human Remains are Inadvertently Discovered in Joshua Tree National Park, California

Buried human remains, presumably Native American, could be inadvertently, not intentionally, encountered in the process of various ground- disturbing or other activities at Joshua Tree National Park, California. Should such human remains be encountered the following steps will be followed, which could invoke the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) and would be covered under section 3(d) of NAGPRA.

1. If any park employees, contractors, volunteers, researchers, etc. should inadvertently discover human remains and/or associated funerary objects, work will immediately be suspended in the vicinity of the discovery and the person in charge will notify the park's Branch Chief of Cultural Resources who will in turn promptly notify the Park Superintendent.
2. The Park Superintendent is designated to engage in government- to- government Native American consultations as part of the Park's ongoing relations with its Native American neighbors. If the inadvertent discovery of human remains or associated funerary objects occurs, regulations in effect for NAGPRA will be strictly followed. The Native American Tribal governments and groups in contact with the Park, who are known from past experience to have cultural interests in the Park, will be notified within twenty- four (24) hours of the discovery.
3. If no future ground- disturbing activities are anticipated upon assessment of the discovery site the human remains or funerary objects may remain in the ground. If no additional ground- disturbing activities will take place at the immediate location, the remains will be left in place and protected during the remainder of the project. Protection will be afforded by fencing, covering, padding, or other means, while a Native American final decision is made regarding final disposition of the remains or funerary objects.
4. If ground- disturbing activities are to continue the human remains will be left in place for an additional forty- eight (48) hours following the twenty- four (24) hour period for initial Native American notification. Native American consultation will take place during this forty- eight (48) hour period either in person or by way of telephone, FAX, or electronic mail (email) and then the human remains and/or funerary objects will be removed from the ground to an area of safety in the Park. Because of limited budgets and chance of vandalism, the National Park Service respectfully requests that those Native American representatives who wish to do so make arrangements through the Park Superintendent to visit the site within this forth- eight (48) hour period and to be present at the agreed- upon time for the removal of the human remains or funerary objects. Limited travel funds will be sought to accommodate this request within the time frame specified. If ground- disturbing activities are to continue the remains will be removed and the location will be monitored by an archeologist during any subsequent ground- disturbing activities in the immediate vicinity of the discovery.
5. Exposed remains will be brushed clean to confirm integrity and minimal analysis will be accomplished, in place. Any artifacts found in association with the discovered human remains, such as funerary objects, sacred objects, and objects of cultural patrimony, also will be left in place until removal to an area of safety, subject to any further procedural considerations from Native Americans found to be culturally affiliated. Any such inadvertently discovered Native American human remains, or associated funerary objects, will not be removed from Joshua Tree

National Park. All analyses will be carried out in the Park. No destructive analysis of the remains will be undertaken, except at the direction of the designated Native American representative(s). Nothing associated with the remains or funerary objects will be placed on public display. Any photographs taken will be for scientific identification only.

6. As determined through various studies, cultural affiliation for the park is most likely to be with Serrano, Chemehuevi, Cahuilla, and/or Mojave. All Native American groups expressing interest will be consulted, in detail, about the human remains or funerary objects. A consensus agreement will be sought among these Native American tribes and groups with interests in Joshua Tree National Park to determine the final disposition of the human remains or funerary objects in question. Depending on the consensus agreement and upon a culturally related Tribal request or requests to do so, re- interment or repatriation of any inadvertently discovered human remains or funerary objects will be carried out within the ninety (90) days following completion of this NAGPRA consultation/mitigation process. Any disputes regarding cultural affiliation or discovered Native American human remains or associated funerary objects shall be resolved in strict accord with the NAGPRA regulations in effect.

7. Nothing in the contractual agreement will be construed to interfere with any Native American instructions, based on NAGPRA consultations, for re- interment elsewhere with appropriate ceremonies.

APPENDIX B: Sensitive Species List (CNPS list 1 through 4)

Listed alphabetical by genus		CNPS	R-E-D	Status	USGS quads in CNPS*
Species	Common Name	rank	code		
Allium parishii	Parish's onion	4	1-1-2	voucher	
Ammoselinum giganteum	desert sand-parsley	2	3-1-1	potential	Hayfield, Hayfield Springs
Androstephium brevifolium	small-flowered androstephium	2	3-1-1	doc/obs	Cadiz Valley SE, Cadiz Valley SW or Clark's Pass
Arabis dispar	pinyon rock cress	2	2-1-1	voucher	Joshua Tree South
Astragalus lentiginosus var. borreganus	Borrego milk-vetch	4	1-1-1	potential	Porcupine Wash or Pinto Mtn
Astragalus lentiginosus var. coachellae (federally endangered)	Coachella Valley milk-vetch	1B	2-2-3	voucher	Seven Palms Valley
Astragalus nutans	Providence mountains milk-vetch	4	1-1-3	doc/obs	
Astragalus tricarinatus (federally endangered)	triple-ribbed milk-vetch	1B	3-2-3	voucher	?, voucher from Key's Ranch
Ayenia compacta	ayenia	2	2-1-1	voucher	Desert Center, Hayfield, Buzzard Spring
Calochortus striatus	Alkali Mariposa Lily	1B	2-2-2	voucher	CNPS only lists 29 Palms, Indian Cove (TLD voucher)
Castela emoryi	Crucifixion Thorn	2	2-1-1	doc/obs	Hayfield, Hayfield Springs, Cadiz Valley SW?
Colubrina californica	Las Animas colubrina	2	2-1-1	voucher	Desert Center, Hayfield, Hayfield Spring, Victory Pass, Porcupine Wash?
Condalia globosa pubescens	spiny abrojo	4	1-2-1	voucher	
Corypantha alversonii	Foxtail Cactus	4	1-1-3	doc/obs	Porcupine Wash, Hayfield
Cryptantha costata	ribbed cryptantha	4	1-1-2	voucher	
Cryptantha holoptera	winged cryptantha	4	1-1-2	doc/obs	
Cynanchum utahense	Utah vine milkweed	4	1-1-1	voucher	
Delphinium parishii subglobosum	Colorado Desert larkspur	4	1-1-2	voucher	
Ditaxis serrata var. californica	California ditaxis	3	?-2-3	voucher	(Jepson does not split var.) Desert Center, Hayfield, Hayfield Springs, Cottonwood Spring, Victory

Pass					
<i>Erigeron parishii</i> (federally threatened)	Parish's daisy	1B	2-3-3	voucher	Yucca Valley South
<i>Galium angustifolium gracillimum</i>	slender bedstras	4	1-2-3	voucher	
<i>Gilia caruifolia</i>	caraway-leaved gilia	4	1-1-1	voucher	
<i>Hulsea vestita callicarpa</i>	beautiful hulsea	4	1-2-3	voucher	
<i>Hulsea vestita parryi</i>	Parry's sunflower	4	1-1-3	voucher	
<i>Lasthenia glabrata coulteri</i>	Coulter's goldfields	1B	2-3-2	voucher	?
<i>Leptodactylon jaegeri</i>	San Jacinto prickly phlox	1B	2-2-3	voucher	only reported for San Jacinto Peak in CNPS
<i>Linanthus maculatus</i>	Little San Bernardino Mountains linanthus	1B	3-2-3	potential	Seven Palms Valley, Joshua Tree South
<i>Lycium parishii</i>	Parish's desert-thorn	2	2-1-1	potential	Porcupine Wash
<i>Matelea parvifolia</i>	spearleaf	2	3-1-1	voucher	Cottonwood Spring, Indian Cove
<i>Mentzelia tridentata</i>	creamy blazing star	1B	2-1-3	potential	Thermal Canyon
<i>Monardella robisonii</i>	Robison's monardella	1B	3-1-3	voucher	Malapai Hill, Indian Cove, Joshua Tree South
<i>Muhlenbergia apressa</i>	apressed muhly	2	2-2-1	voucher	Indian Cove (TLD voucher), CNPS doesn't have voucher
<i>Penstemon thurberi</i>	Thurber's beardtongue	4	1-2-1	voucher	
<i>Physalis lobata</i>	lobed ground-cherry	2	3-1-1	voucher	Clark's Pass
<i>Polygala acanthoclada</i>	thorny milkwort	2	2-1-1	voucher	Porcupine Wash
<i>Portulaca halimoides</i>	desert portulaca	4	1-2-1	voucher	
<i>Proboscidea althaeifolia</i>	desert unicorn-plant	4	1-1-1	doc/obs	
<i>Salvia eremostachya</i>	desert sage	4	1-1-1	doc/obs	
<i>Selaginella eremophila</i>	desert spike-moss	2	3-2-1	doc/obs	?
<i>Senna covesii</i>	Cove's cassia	2	2-2-1	potential	Desert Center, Hayfield,
<i>Sidalcea neomexicana</i>	salt spring checkerbloom	2	2-2-1	doc/obs	?
<i>Streptanthus campestris</i>	southern jewel-flower	1B	2-1-2	voucher	nearest locality in CNPS Toro Peak, San Jacinto Peak
<i>Stylocline sonorensis</i>	mesquite neststraw	1A		potential	known in CA from only one collection at Hayfield's Dry Lake (Hayfield)

Tetracoccus hallii	Hall's purple bush	4	1-1-1	voucher	
Tetradymia argyrea	stiped horsebrush	4	1-1-1	doc/obs	
Wislizenia refracta	jackass-clover	2	3-2-1	voucher	nearest locality in CNPS Palen Lake, 29 Palms
Xylorhiza cognata	Mecca-aster	1B	2-2-3	potential	Cottonwood Spring, Cottonwood Basin, Thermal Canyon, West Berdoo Canyon,
Xylorhiza orcutti	Orcutt's woody-aster	1B	2-2-2	potential	Hayfield

*If the species is vouchered or doc/obs on our current species list, then the quads listed are only quads within Jtree,
if the species is a potential, it's because the quad listed in CNPS is within Jtree but our current list doesn't have it,
if the species is listed on our current list as doc/obs or voucher but no Quads within Jtree are listed in CNPS a "?" is indicated.
The definition for plants listed as 2, 1B, or 1A meet the requirements of CEQA for protection as a rare, endangered, or threatened species.